2012

ArcGIS 10.1 Viewer Class Manual

By the Department of Revenue

Technical Support Section

8/9/2012

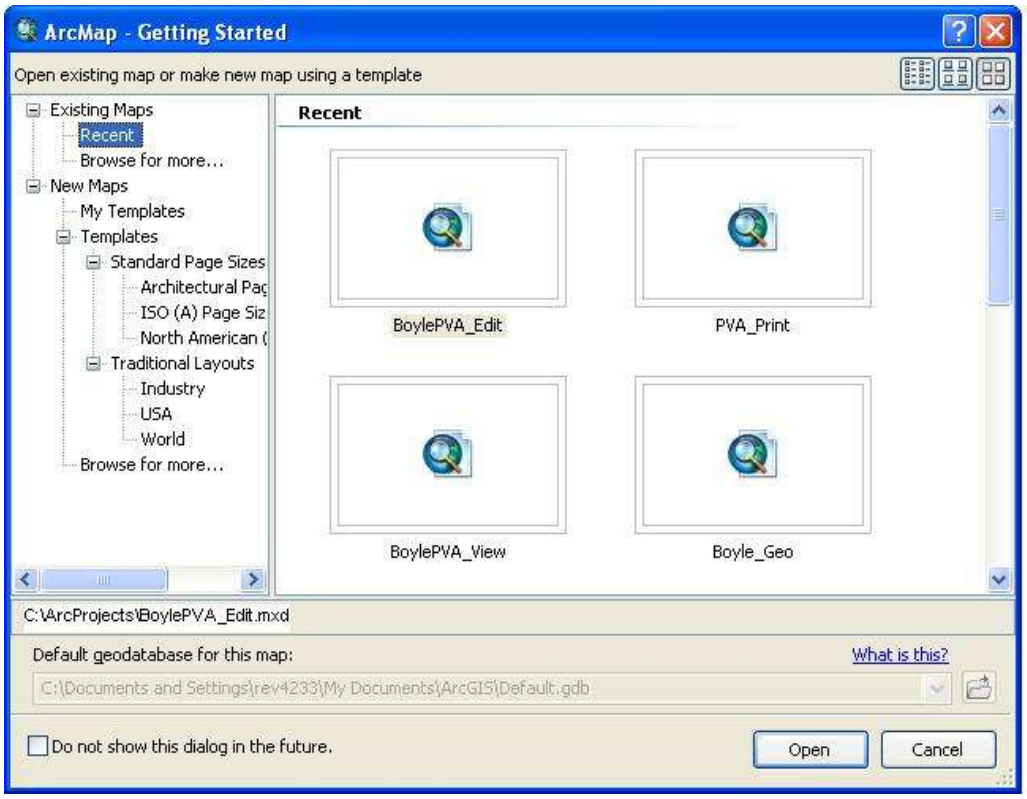
Table of Contents

Getting Started with ArcMap…

To start the ArcMap Program, double click the ArcMap icon on your desktop… 

An introductory splash screen for ArcGIS will appear for a few seconds and then disappear. After the ArcGIS splash screen disappears, it will be replaced by an untitled ArcMap dialog box showing a list of projects. Please choose a project as needed. The most common projects will be named:

CountyPVA_Edit.mxd
CountyPVA_View.mxd
PVA_Print.mxd
Soil_Program.mxd



For this class, please click the BoylePVA_Edit.mxd project and click Open.

Each project stores a list of geodatabases, shape files, and images that were saved from a previously opened session. It stores the color and symbol types for each point, parcel, etc. It also stores external databases such as tax rolls, building and land characteristics, and the path to each database on your network.

File Geodatabases (example: Parcels.**gdb**) store GIS data replacing folders on a computer's file system. Dataset(s) are held inside as a file that can scale up to 1 TB in size. The gdb option is recommended over personal geodatabases by ESRI, (has a limit of 2 gigabytes and performance degrades at 250 megabytes) and shapefiles. The file geodatabase also allows for topology, which helps users fix errors in the GIS data.

Please note: ArcMap is the mapping portion of ArcView (Basic), ArcEditor (Standard), and ArcInfo (Advanced). ArcView has the least amount of functionality while ArcInfo has the most. With the release of ArcGIS 10.1, new version names are in parentheses.

Table of Contents (ToC) (or Map Legend)

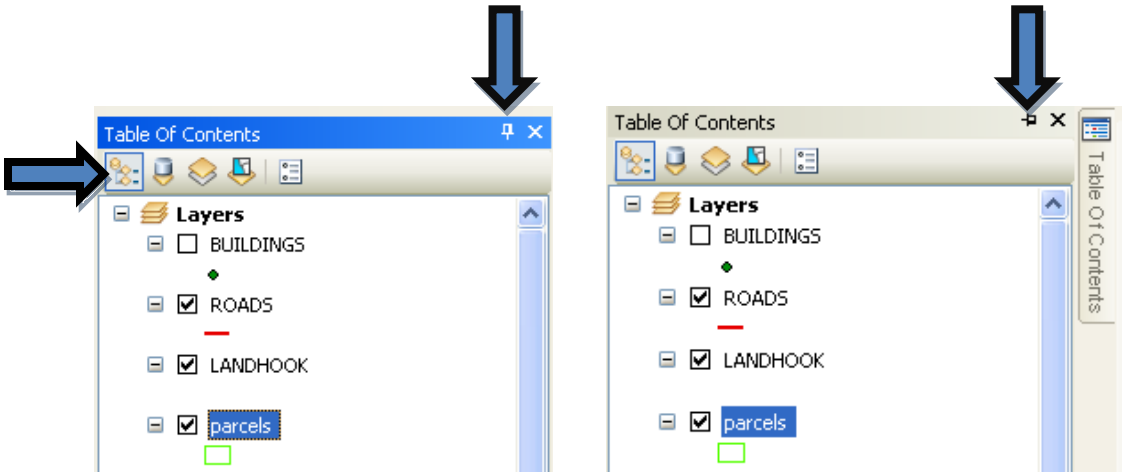
The ArcMap table of contents lists all the layers on the map and shows the features symbology. The table of contents helps you manage the display order of map layers and symbols too. The map layers at the top of the table of contents draw on top of those below them in the project, so if a layer is not displayed, check the order in the Table of Contents. To rearrange, simply left mouse click and hold on the layer and drag it up or down in the table of Contents until the desired order.

Use the check box or icon to the left of each map layer to turn it on or off. Holding down the CTRL key and clicking a check box turns all map layers on and off simultaneously.

When the map display is out of range for scale-dependent drawing, the layers will not be visible. Layers that are out of range of the current map scale are indicated in the table of contents by a gray check box with a scale bar under it.

The table of contents has several ways of listing layers: by drawing order, source, and whether layers are visible or selectable. Click the icon at the top of the tab to switch between these grouping methods. You can tell which mode is active by looking at the button (the active one is highlighted) and the organization of the items in the table of contents. The different ways of listing layers are simply methods of displaying information about the same layers.

A new feature in ArcGIS 10 is the retractable side bars. Your Table of Contents window, ArcToolBox, ArcCatalog, Identify Box, etc. are all side bars. Click the thumb tack in the top right corner of the Table of Contents, the side bar or window will only appear as the user places the mouse over the side bar tab.



Use List By Drawing Order to alter the contents of your map, such as to change the display order of layers on the map, rename or remove layers, and create or manage group layers. All the data frames in your map are listed when the table of contents is sorted by drawing order.

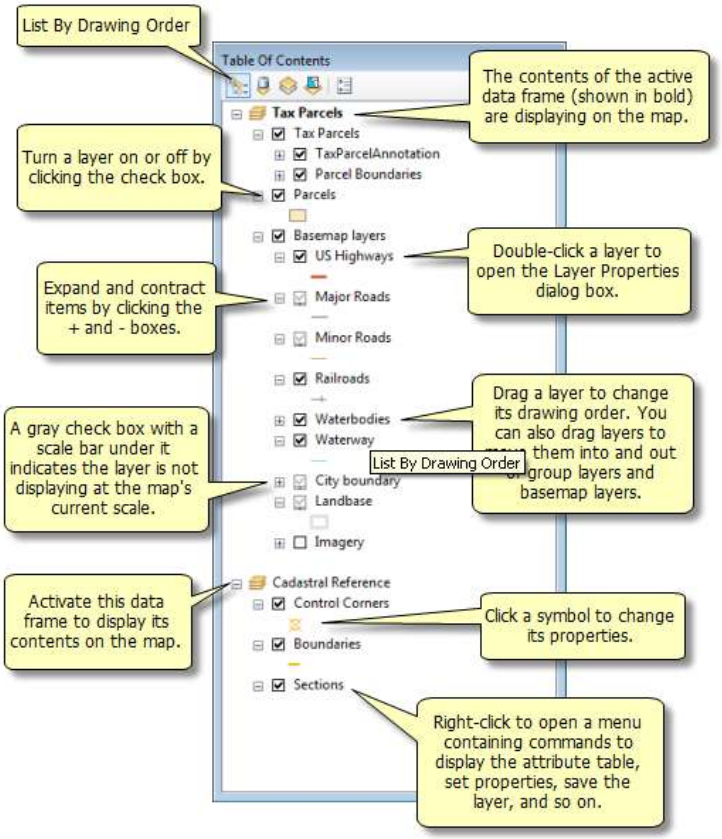
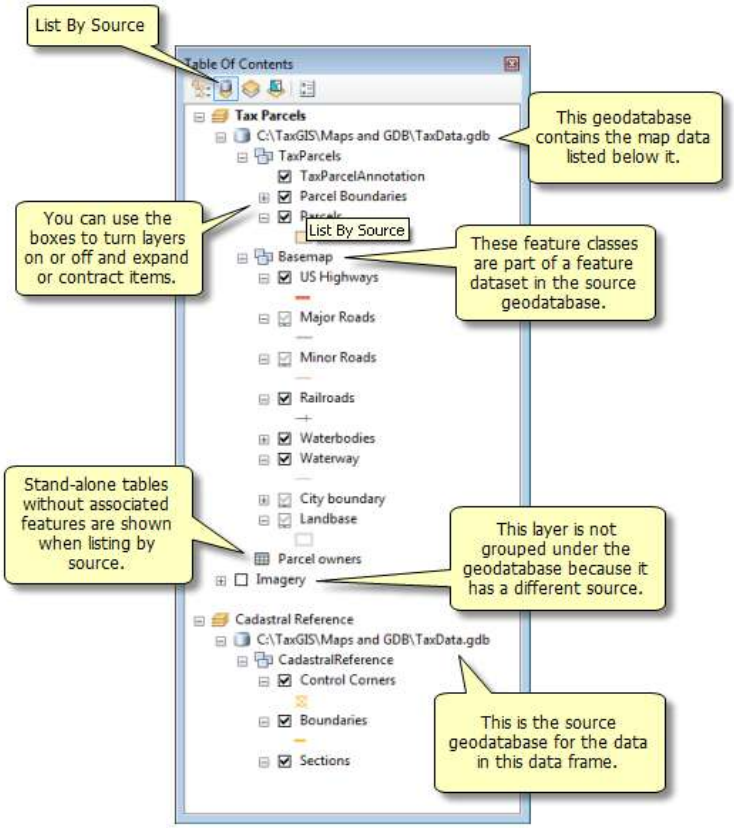


Image from www.ESRI.com

Note: If nothing can be selected go to selection on tool bar, Interactive Selection Method, Click on Create new selection

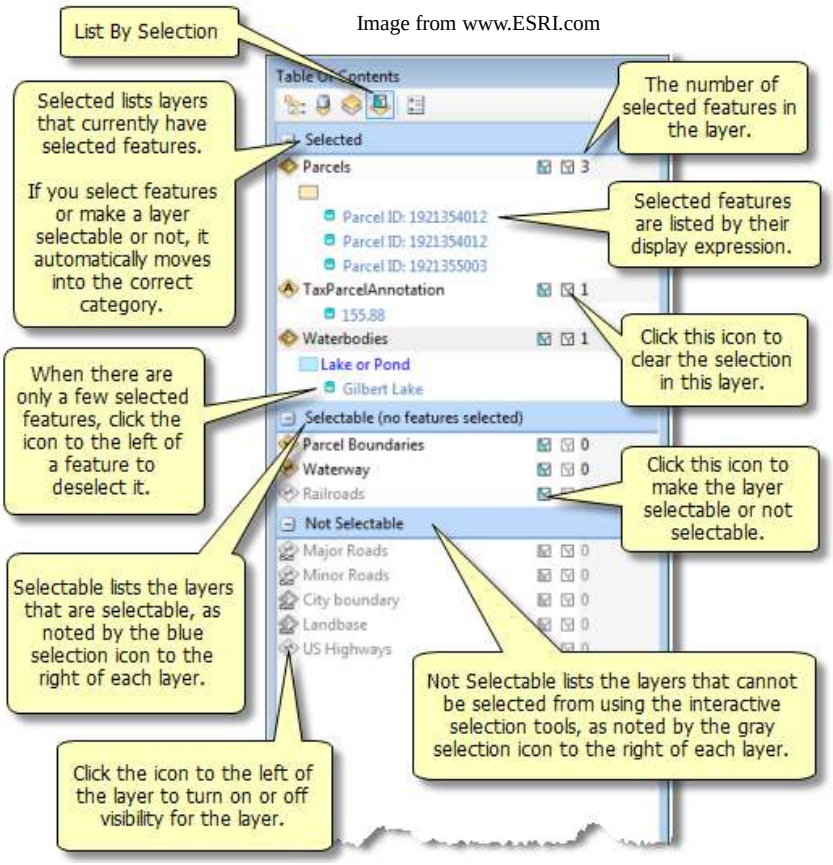
Click List By Source to show the layers in each data frame with the layers organized by the folders or databases in which the data sources referenced by the layers can be found. This view will also list tables that have been added to the map document as data.



Click List By Visibility to see a dynamic listing of the layers currently displayed in the active data frame. The way layers are listed updates automatically as you pan and zoom, interact with the map, select features, and turn layers on and off.

Image from www.ESRI.com

Click List By Selection to group layers automatically by whether or not they are selectable and have selected features. A selectable layer means that features in the layer can be selected using the interactive selection tools, such as those on the Tools toolbar or the Edit tool, when in an edit session.



You can use the Options button on the table of contents to set display properties.

The first step to using ArcMap is learning the location of some basic GIS tools. In ArcMap, the toolbars can be easily placed wherever the user needs or wants them by clicking the left mouse button and holding, then dragging the toolbar by the far left vertical line on each toolbar and docking where desired.

The Standard toolbar will be used by both editors and viewers. It shows the scale, the Add Data button, ArcCatalog, and ArcToolbox.

ArcMap Standard toolbar buttons and their functions

Button	Name	Function
	New map file	Creates a new map
	Open	Opens an existing map
	Save	Saves the current map
	Print	Prints the current map
	Cut	Cuts the selected element(s)
	Copy	Copies the selected element(s)
	Paste	Pastes the clipboard contents into your map
	Delete	Deletes the selected element(s)
	Undo	Undoes the last action
	Redo	Redoes the previously undone action
	Add Data	Adds new data to the map's active data frame
	Editor toolbar	Shows the Editor toolbar so you can edit the map's data
	Launch ArcCatalog	Starts ArcCatalog
	Show/Hide ArcToolbox	Shows/Hides the ArcToolbox window
	Show/Hide Command Line window	Shows/Hides the Command Line window
	Start ModelBuilder	Starts ModelBuilder
	Table of Contents	Turns on and off the Table or Contents or the Layer Manager
	ArcToolbox Search	Helps users search for tools in the ArcTool box

Image from www.ESRI.com

The next toolbar that will be used by both editors and viewers is the Tools toolbar. The tools here should look very familiar. This toolbar contains some old favorites, whether you used ArcView 3.X or GeoSync 3.X. Revenue installs this toolbar on the left side of the mapping area.

Image from www.ESRI.com

ArcMap Tools toolbar buttons and their functions

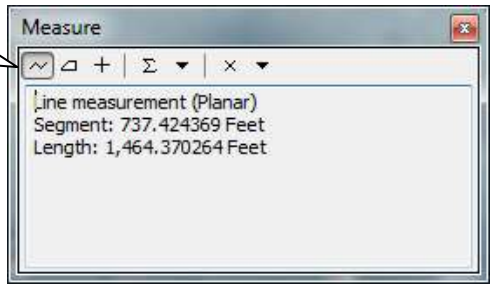
Button	Name	Function
	Zoom In	Allows you to zoom in to a geographic window by clicking a point or dragging a box
	Zoom Out	Allows you to zoom out from a geographic window by clicking a point or dragging a box
	Fixed Zoom In	Allows you to zoom in on the center of your data frame
	Fixed Zoom Out	Allows you to zoom out on the center of your data frame
	Pan	Allows you to pan the data frame
	Full Extent	Allows you to zoom to the full extent of your map
	Back	Allows you to go back to the previous extent
	Forward	Allows you to o forward to the next extent
	Select Features	Allows you to select features by clicking or dragging a box
	Clear Selected Features	Deselects all of the currently selected features in the active data frame
	Select Elements	Allows you to select, resize, and move text, graphics, and other objects placed on the map
	Identify	Identifies the geographic feature or place on which you click
	Find	Finds features in the map
	Go To XY	Allows you to type an x,y location and navigate to it
	Measure	Measures distance on the map
	Hyperlink	Triggers hyperlinks from features
	HTML Pop-up	Triggers HTML pop-ups from features
	Create Viewer Window	Creates a new viewer window by dragging a rectangle
	Find Route	Find route between stops specified

A new feature for ArcGIS is the shortcut keys, a list of shortcuts keys are located in the back of this manual, for example: hold the "c" key down and left mouse click to pan around map.

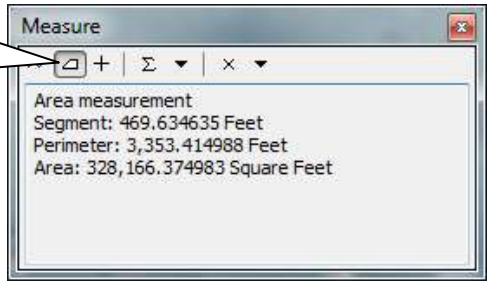
The Measure Tool is located on the Tools Toolbar.

To start, click the measure tool button on the Tools Toolbar; this will pop up a new window with several useful tools. It will allow you to measure polygons (ex. fields of crops) by digitizing the boundary and measure lengths of lines (ex. creeks) or other features on an aerial photo.

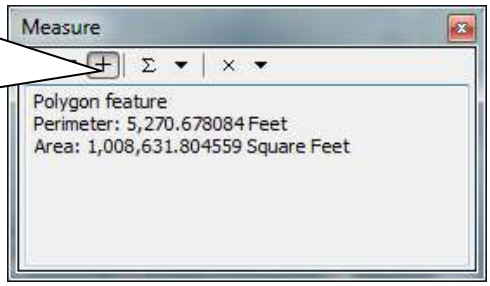
Measure Line: this tool will draw a line feature to measure its distance.



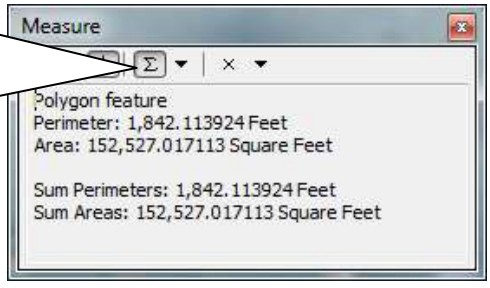
Measure Polygon: this tool will draw a polygon to measure an area in Acres or Square feet.



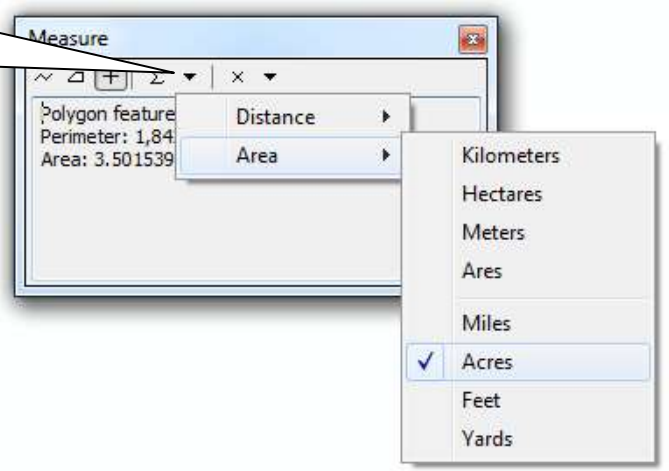
Measure a Feature: This tool will identify the Perimeter, Acres, & Square Feet of any polygon layer, ex. Parcels.



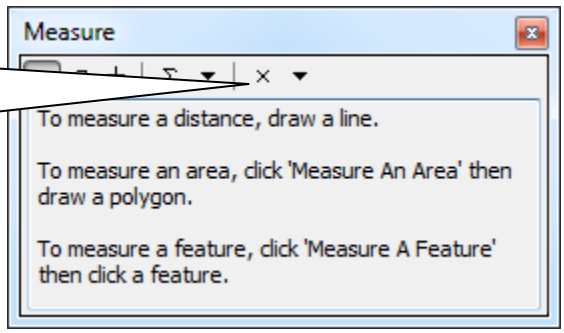
Sum Button: This is an on/off switch for ArcGIS to keep acreage & perimeter total of every parcel clicked with the Measure tool.

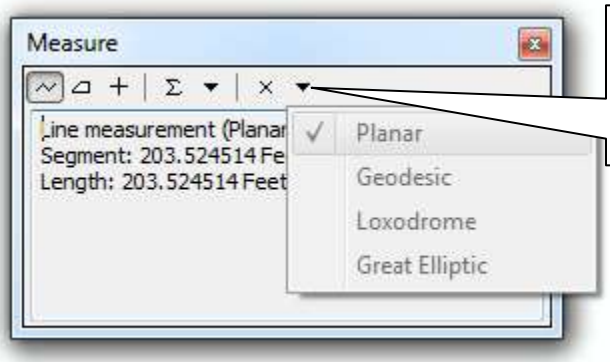


The first drop down arrow sets the Distance & Area units for measuring. Select the distance, and then select feet and select Area, then select Acres.



This button will clear the selection and reset the results for further measuring.



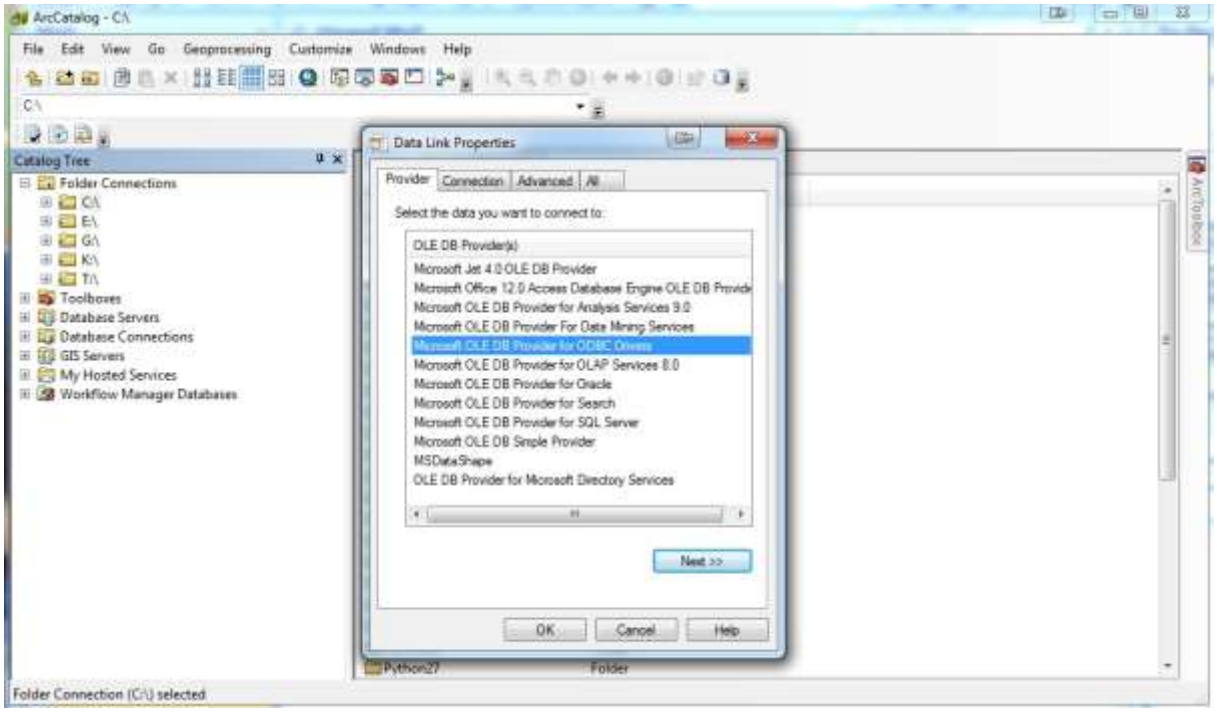


Choose Measurement type

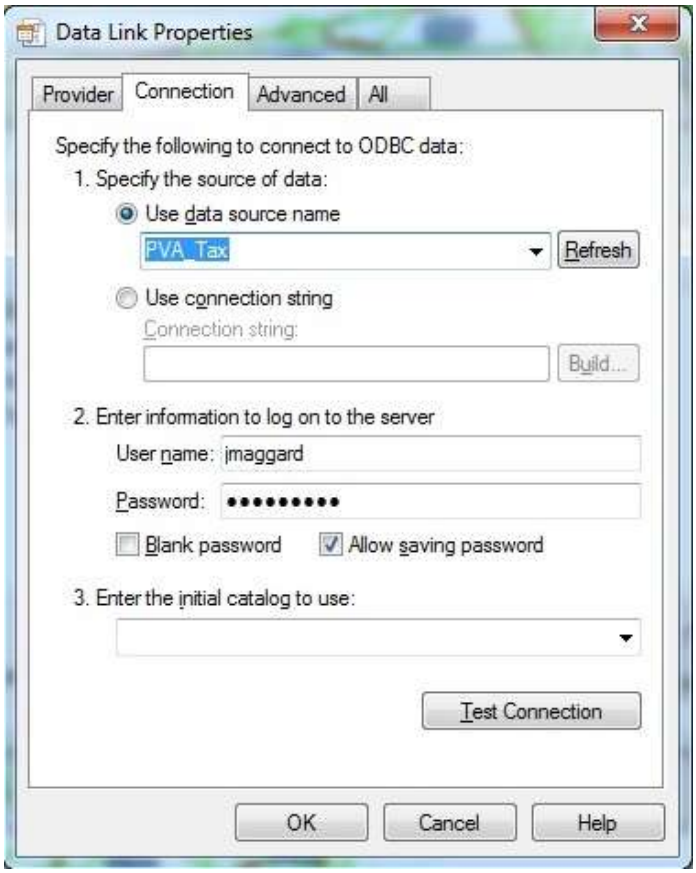
Adding External Data by Joins and Relates

In ArcGIS 10.1, ArcCatalog is required to setup an external database such as a tax roll.

To start the ArcCatalog program, double click the ArcMap icon on your desktop… Search for the Add OLE DB Connection button. Click the Add OLE DB Connection, this will open the Data Link Properties box, select Microsoft OLE DB Provider for ODBC Drivers and click Next.



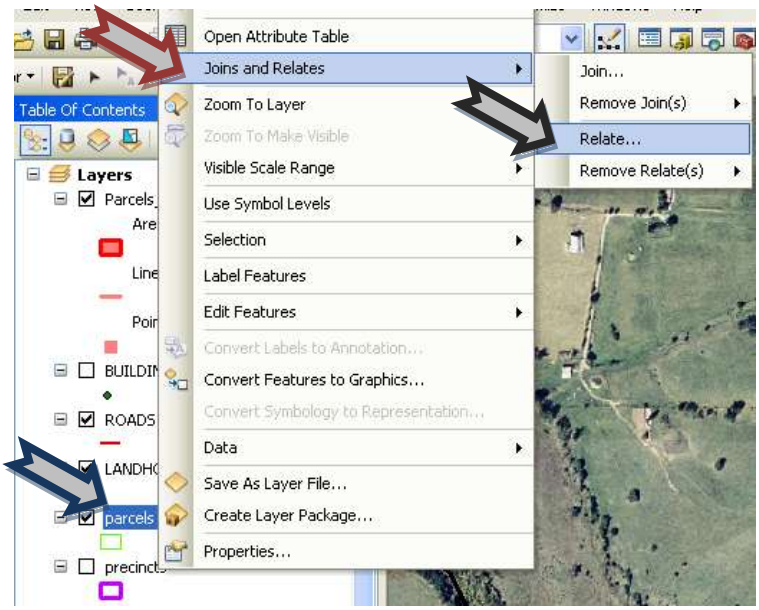
In the Data Link Properties window, under the Connection tab, drop down the first box select PVA_Tax. In some counties, this file will be named County Name_Tax. Next, click the Test Connection button, if connection fails, type in a password for PVD Counties. (Any office PVD password will work.) No password needed in ARM or IPS counties. When test connection succeeds, click OK.

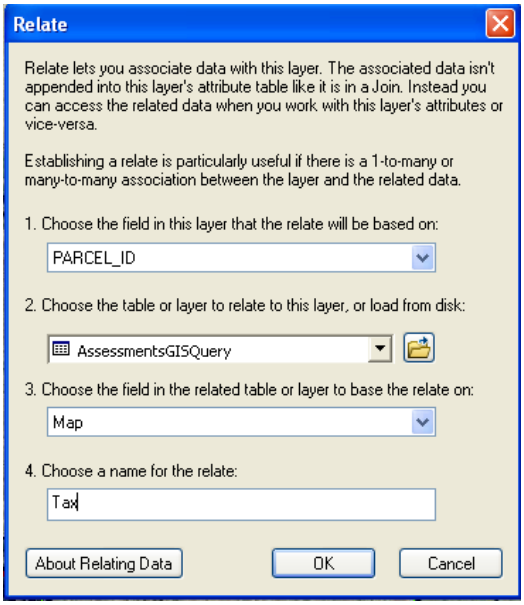


In the Catalog Tree on the left of the screen, single click on the Database Connections. Click the F5 key on the keyboard to refresh the screen and show the new OLE DB Connection.odc file. Rename the new OLE DB Connection.odc file to PVA_Tax.odc, then double click the PVA_Tax.odc to open the PVD tables.

A GIS parcel layer in a Geodatabase or a Shapefile can join or relate to an external data base such as a tax roll. This can be setup by:

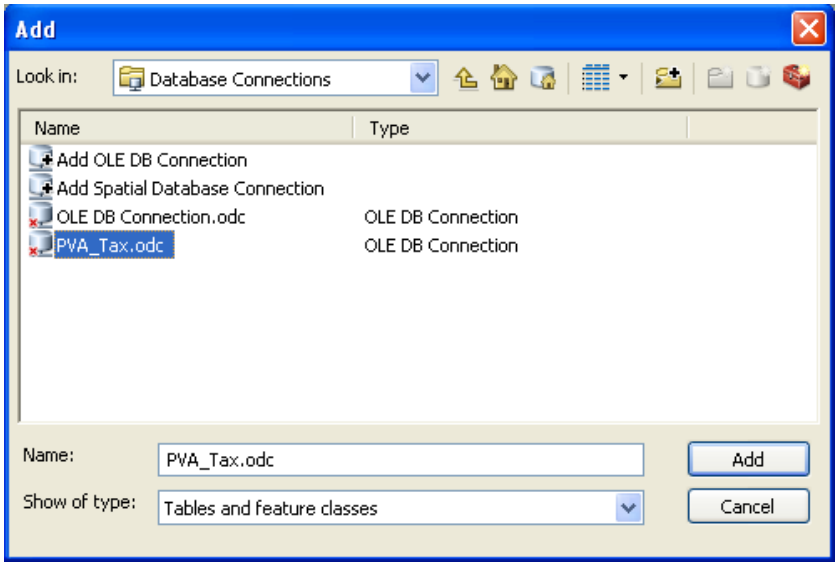
1. Right click on the desired layer such as Parcels. (Blue Arrow)
2. Click on Joins and Relates option. (Red Arrow)
3. Click Relate (Black Arrow)



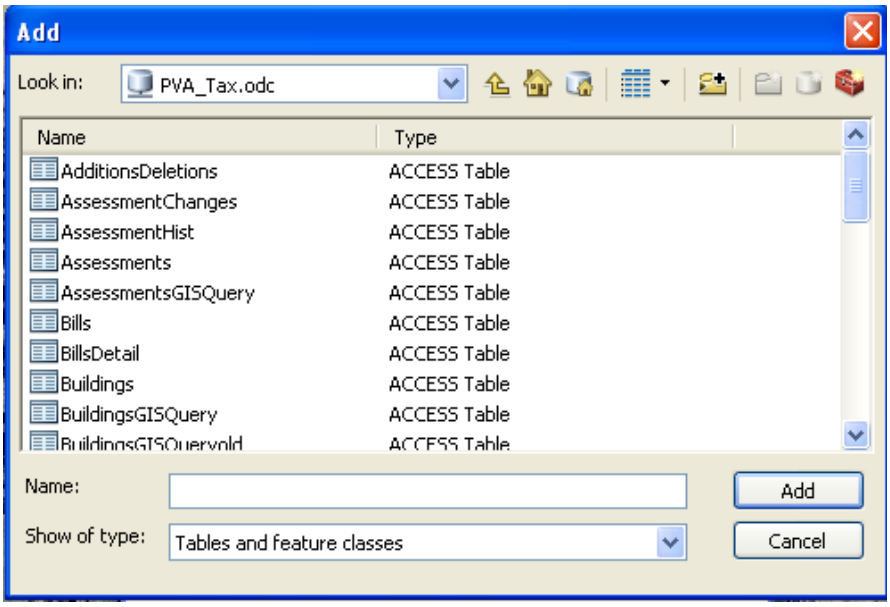


In the Relate window, the relate field should be dropped down a select Parcel_ID in all counties using the Department of Revenues Parcel field format.

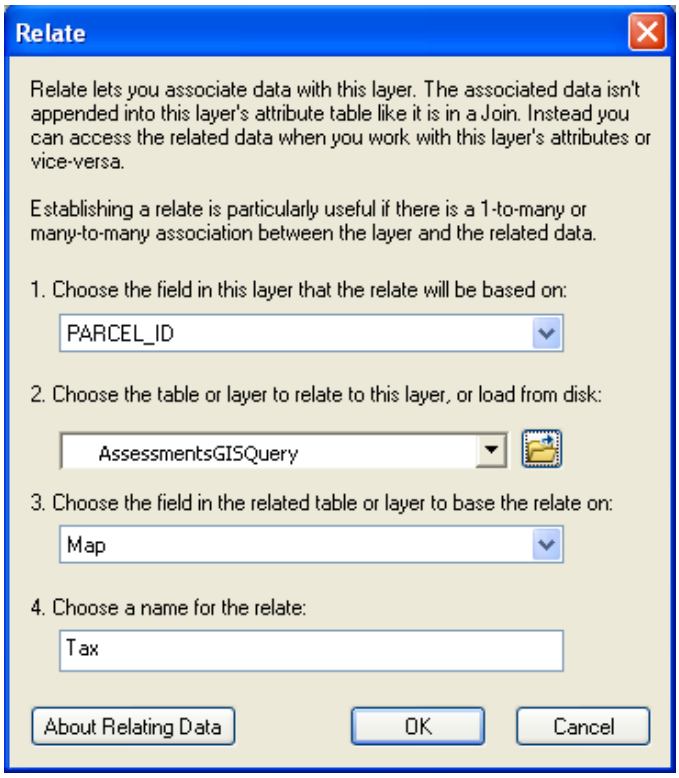
In the second drop down box, click the folder/browse button. Then click on the down arrow in the Look in box and select Database Connections. This should display PVA_Tax.odc, click on PVA_Tax.odc and click the Add button.



This will open your tax roll tables, only click to relate to tables ending in ***query***. Do NOT click any other tables in this window. The query tables were created for GIS programs.



Double click on AssessmentGISQuery (AssessmentsGISQuery does not work) to select. This will insert the table into the second field or the Relate window and also auto select the relating field. This may not always be successful. Fill in the fourth field with the name or the table.



Tables to relate by tax rolls:

PVD	ARM	IPS
AssessmentsGISQuery	PVAMain	vm.do.external
OwnersGISQuery	LAND	
LandGISQuery	RES	
BuildingGISQuery	COMM	
SalesGISQuery		
PhotosGISQuery		
SketchGISQuery		

Soils will be available for relate from the K:\CountyPVA\MDB\Soil_Val.dbf for all users.

Setting up the PVA_Tax.odc is only done one time, each additional table will be picked from the tables which will always show up under the PVA_Tax.odc file.

About Map Tips

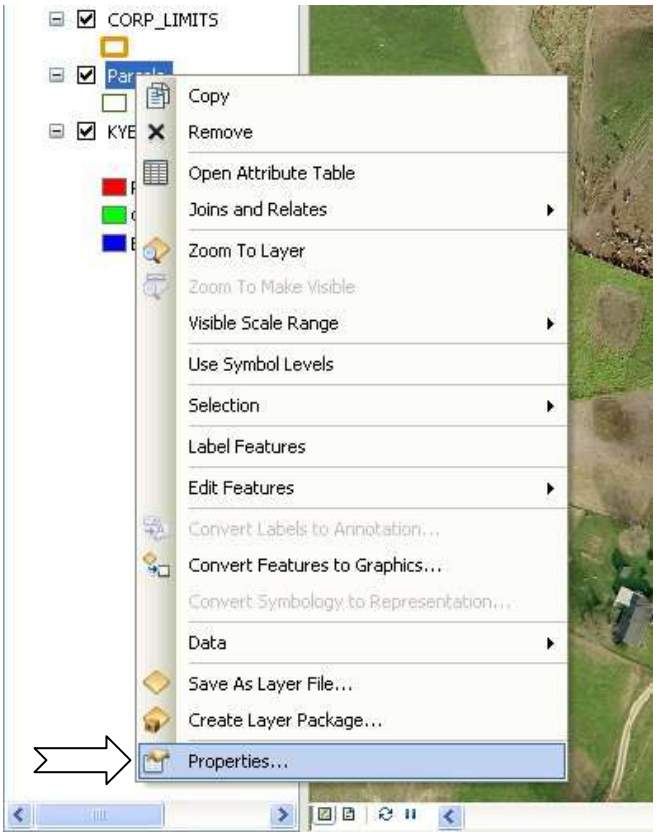
MapTips provide an additional way to show information from map features to people who will be using your maps with ArcMap. MapTips go beyond simply labeling the features with text by providing interactive access to data via the map.

MapTips pop up as you place the mouse cursor over a feature, providing a quick way to see the owner name of a parcel or any other particular piece of information. ArcMap lets you choose which attribute field you want to display as your MapTip. In the example below, the parcel layer uses the values from the Parcel_ID field as a MapTip.

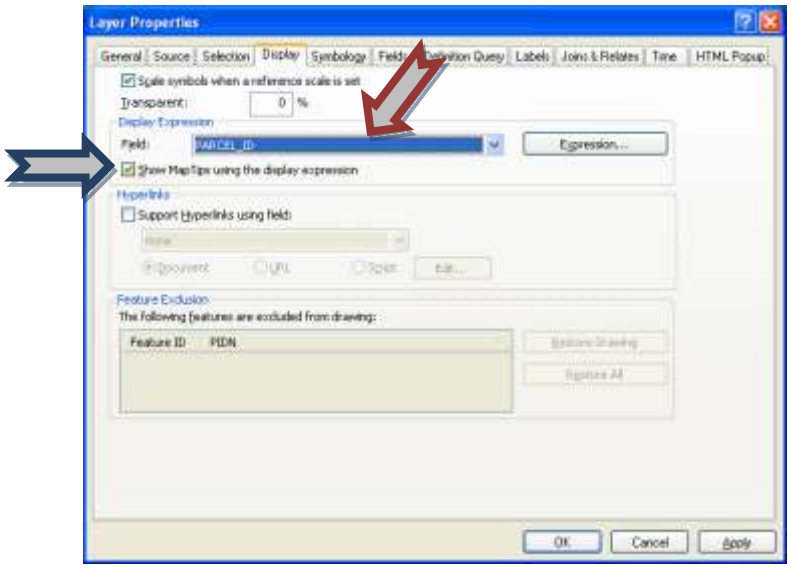
or

How to display MapTips

1. Right click the layer you want to display the MapTip in the Map Legend (Table of Contents) and click Properties at the bottom of the drop down list. (Double clicking the layer will also open the Layer Property window.)



2. Click the Display tab and check Show MapTips. (See Blue Arrow)



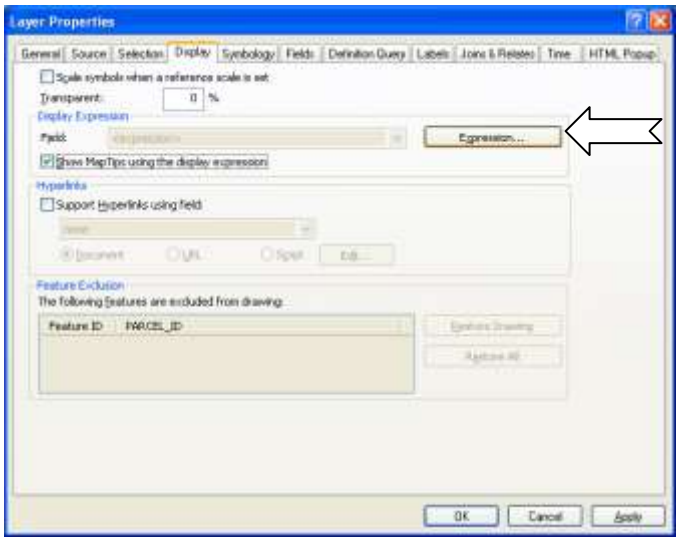
3. Click the Fields drop down and select the desired Attribute Field. (See Red Arrow)

   Ex. (Parcel_ID)

4. Click OK.
5. In data view, move the mouse pointer over a feature to see the MapTip.

Advanced Map Tips

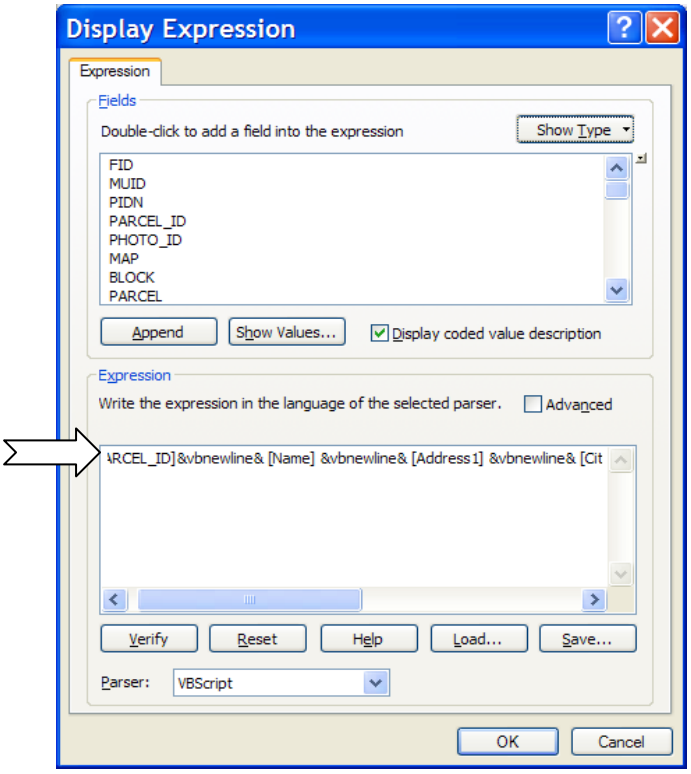
ArcGIS 10 allows you to display multiple fields with Map Tips. Notice in the image below, to the right of the Field drop down box will be the Expression button. Click the Expression button to display the Display Expression Box.



In the Expression box area (text in blue), delete any text and type:

[PARCEL_ID] &vbnewline& [Name] &vbnewline& [Address1] &vbnewline& [Address2] &vbnewline& [City] &", "& [State] &" "& [Zip] &vbnewline& [Location] &vbnewline& [Descriptio] &vbnewline& [Deed_1]

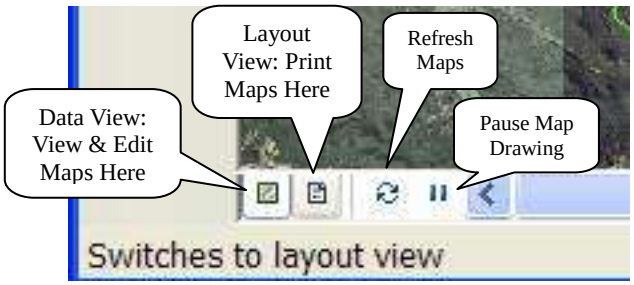
You can also double click the needed field and type in **&vbnewline&** and double click the next field and type in **&vbnewline&** and then double click another field and continue this until all fields desired are included.



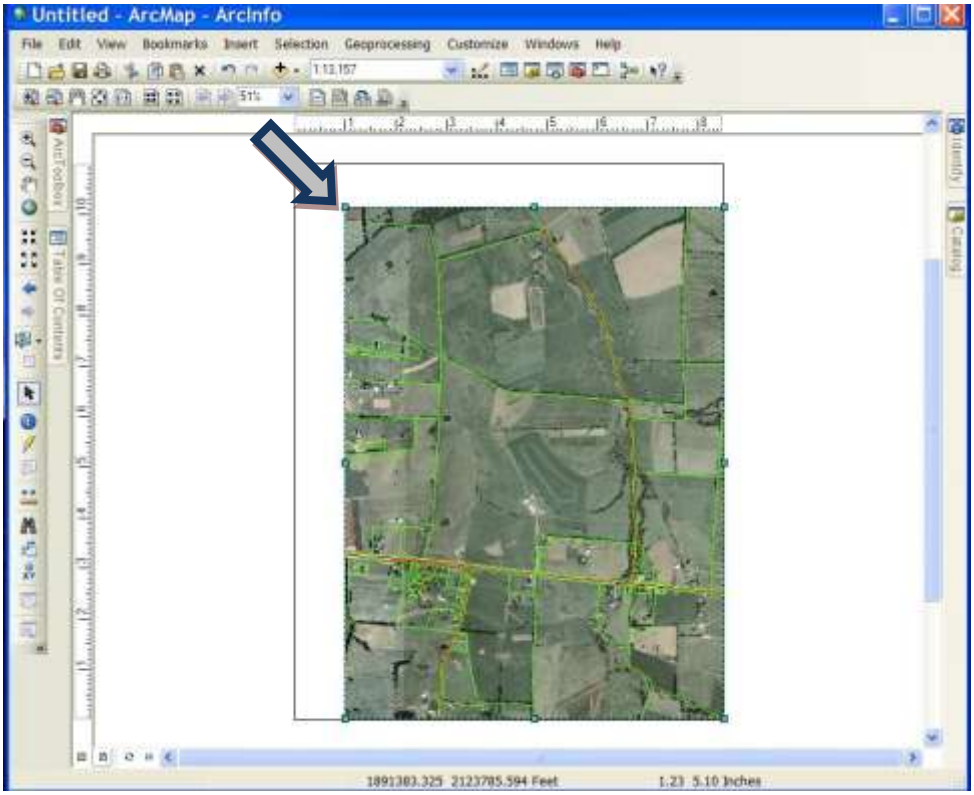
Next, click the OK button on the two open windows and enjoy the new multi-field and multi-line ArcGIS 10 map tips.

Setup Layout View Template (for Emailing and/or Printing)

At the bottom left of the screen are four very small buttons.
Click the Layout View to start print maps.



Adjust map drawing area in layout view box, click and hold to move vertices.



Do NOT let the mapping area overlap the paper boarder shown in the viewing area. Only drag out the right, left, and bottom of the mapping area. Leave the top vacate for a PVA office header.

After the desire amount of space is used for mapping, look at the Layout toolbar for ArcGIS 10.

	Zoom In	Allows users to zoom in on the layout by clicking a point or dragging a box.
	Zoom Out	Allows users to zoom out on the layout by clicking a point or dragging a box.
	Pan	Allows users to pan the layout without changing the mapping area.
	Zoom Whole Page	Allows users to zoom to full layout extent to see entire map.
	Zoom to 100%	Allows users to zoom to 1:1 page scale to see map as if printed.
	Fixed Zoom In	Allows users to zoom in on the center of the layout.
	Zoom Out	Allows users to zoom out from the center of the layout.
	Go Back to Extent	Allows users to go back to the previous view.
	Go Forward to Extent	Allows users to go forward to the next view.
	Toggle Draft Mode	Toggles the map and file location of data on map
	Focus Data Frame	The map frame toggles between solid and slashed lines.
	Change Layout	Changes the format & map templates.
	Data Driven Pages	Activates the Data Driven Pages toolbar.

Click **Insert** from the Main Menu and select **Text**, the text box will appear in the middle of the mapping area. (See diagram on next Page)

Click and hold the left mouse button and move the box to its desired location.

Double click the text box to open the Property box. Center Justify

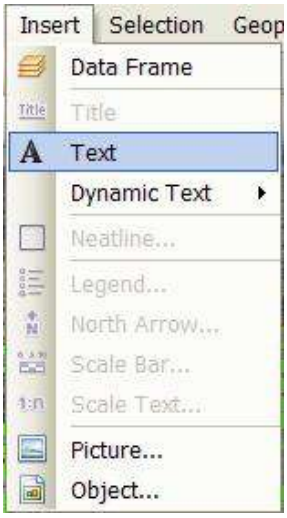
In the Properties box, type in:

Boyle County
Property Valuation Administrator

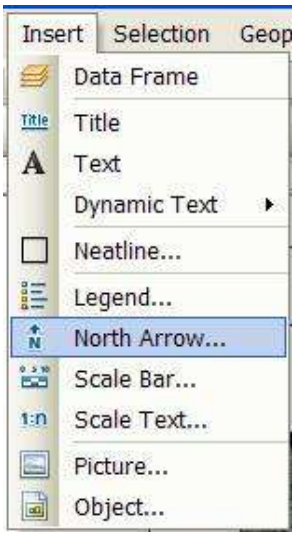
Click the Change Symbol button to change the font, color, style, and/or etc.) **14, Bold, Black**

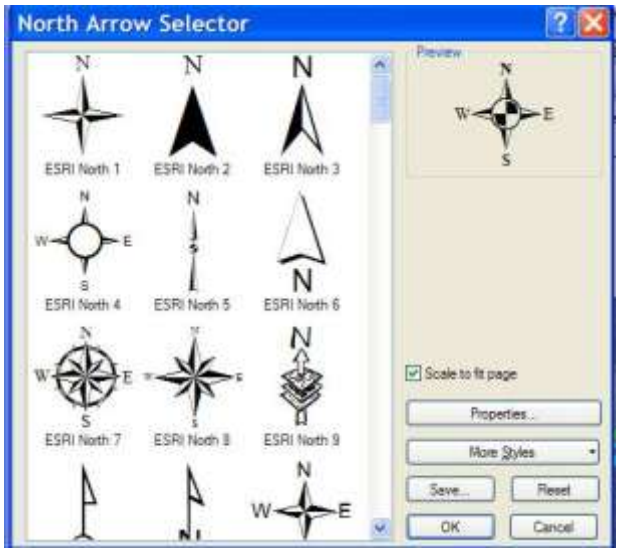
Click **Insert** from the Main Menu and select **Text** again, the text box will appear in the middle of the mapping area again. Click and hold the left mouse button and move the box to its desired location. Double click the text box to open the Property box. Left Justify. In the Properties box, type in:

PVA Name — Change font 12, Bold, Black
Address 1
Address 2
City, State & Zip
Office phone number



Click Insert from the Main Menu and select North Arrow.

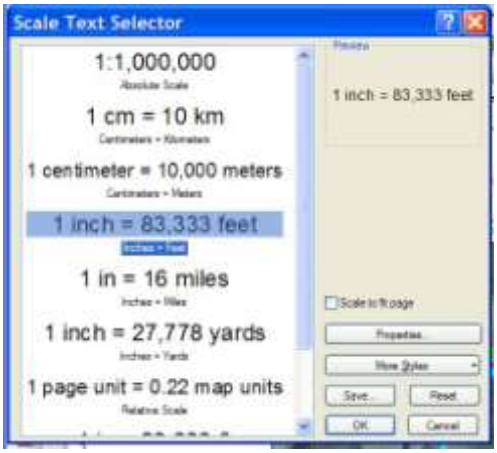




Click Insert and select Scale Text, choose **1 inch = 83,333 feet** from the list, this gives you the format for the scale that changes automatically with the size of your map.

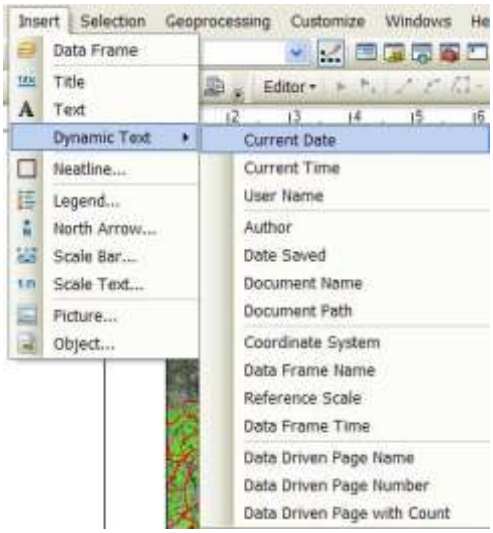
1 inch = 200 feet 12, Bold, Black

After selected go to the top in scale box type 1:4800 this will give you a 400 ft. scale map. All scales multiples of 12. (1:1,200 = 100 ft. scale / 1:2,400 = 200 ft. scale, etc)



Click Insert again and put the mouse over Dynamic Text, then select Current date.
This will insert the current day's date and will always have the computers date inserted on the map. Double click the in the Current date on the map, this will open the Properties box. Insert the word "Print" in front of the word date, see example below. Next, erase the word short, and type in MMMM dd, yyyy, this will insert the actual date. In the next line down, type Aerial Date: Summer 2010, or whenever the aerials where flown.

Print Date: September 29, 2011 11, Black
Aerial Date: Summer 2010 11, Black

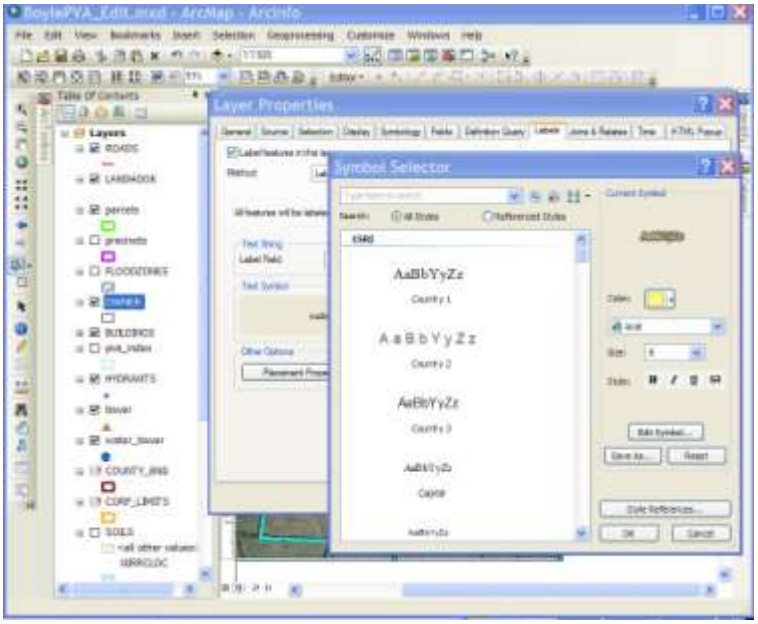


Click **Insert** from the Main Menu and select **Text** again, the text box will appear in the middle of the mapping area again. Click and hold the left mouse button and move the box to its desired location. Double click the text box to open the Property box. Center Justify. In the Properties box, type in:

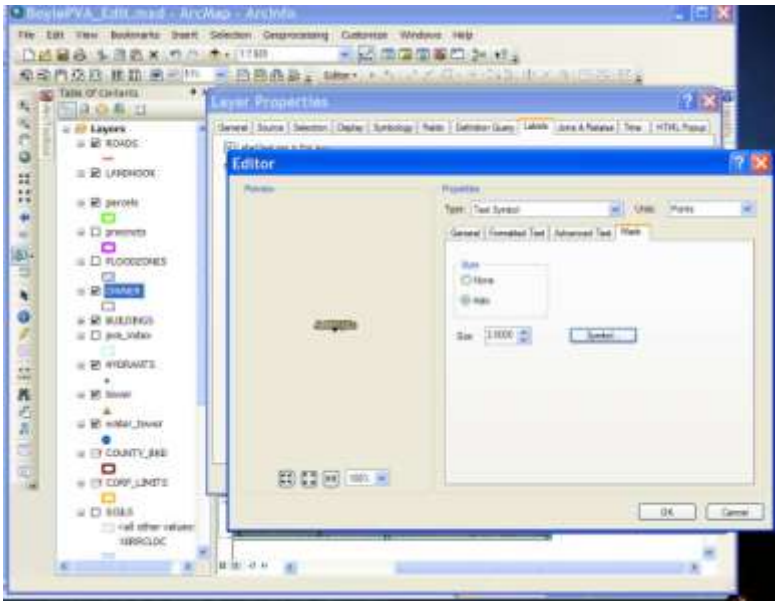
Maps are to be used
for identification only,
NOT FOR CONVEYANCE
(12, Bold, RED)

SAVE-SAVE-SAVE

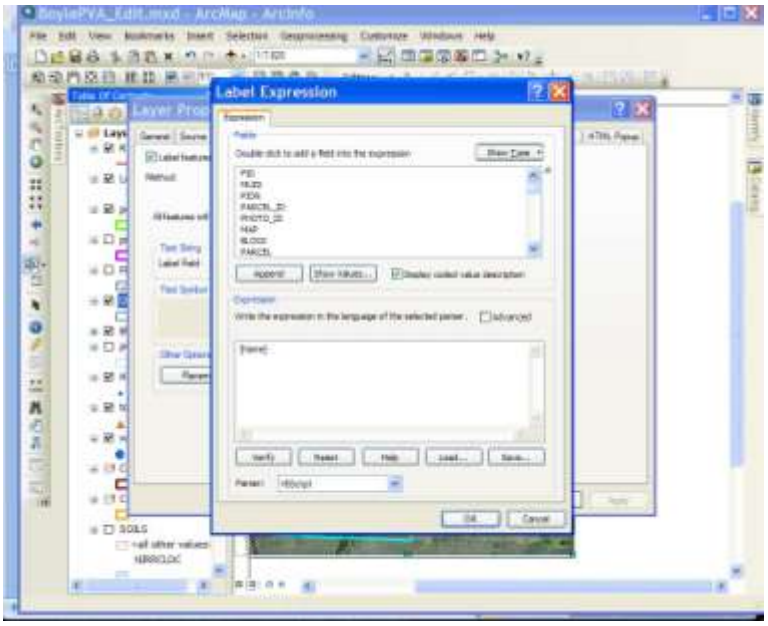
Double click on Owner layer in Table of Contents (TOC)
This will open the Layer Properties window. Click the Labels tab, and click the Label Field drop down box and select Owner or Name (Owner name field).
Check the label features check box top left corner and click OK.
Click on color box and change to Light Apple, move mouse over colors for names.



Click the Symbol button and then click the Edit symbol button in the Symbol Selector window. Click the Mask tab in the Editor window and click on the word Halo. Next, click the Symbol button and this will open another Symbol Selector window, click the Fill Color box (White) and change to Black.

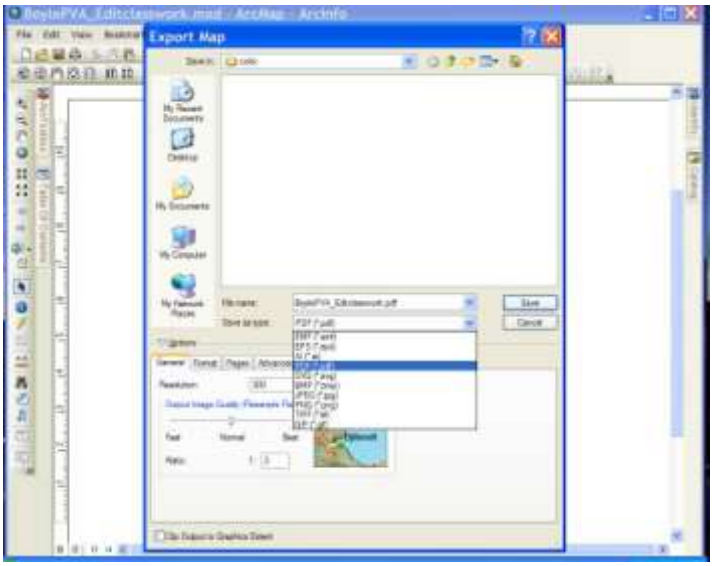


Click OK, OK, OK, OK, until the map reappears.
To add multiple labels, double click the Owner layer and select the Labels tab.
Click the Expression button.
Click in the lower box after Name (or Owner) and type in: **&vbnewline&**
then double click Parcel_ID.
Click OK and OK again, to go back to the layout map.



Click the Zoom Whole Page button to view entire map.
Center the needed parcels in viewing area using the pan hand from the Tools toolbar. Turn on/off layers you want displayed on the map (ie; buildings, towers).
Before printing map, check scale on map. Try to get scale in multiplies of 50 or 100.
An example of the finished map is on top of the next page.

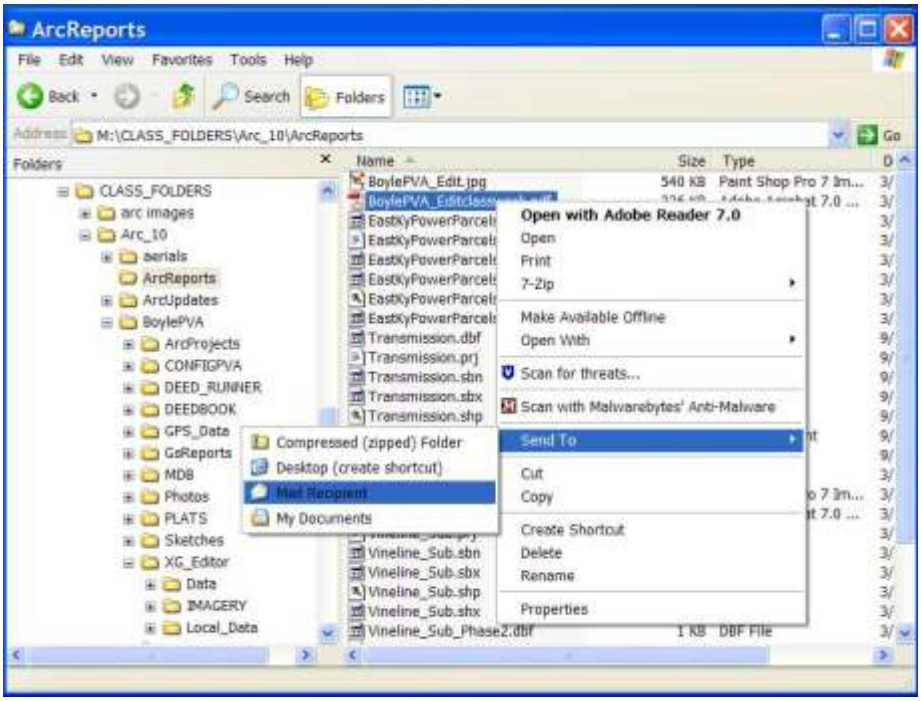
To export the map, click File from the Main Menu, from the drop down, click Export map. Navigate to the K:\ Arc Reports\ then name the map with an easily identified name and save as a .pdf or .jpg file.



Note: Adobe Reader 9 or 10 has function to export map with georeference
(Can hold mouse over .pdf map displays Latitude & Longitude)

To email the exported map to a recipient

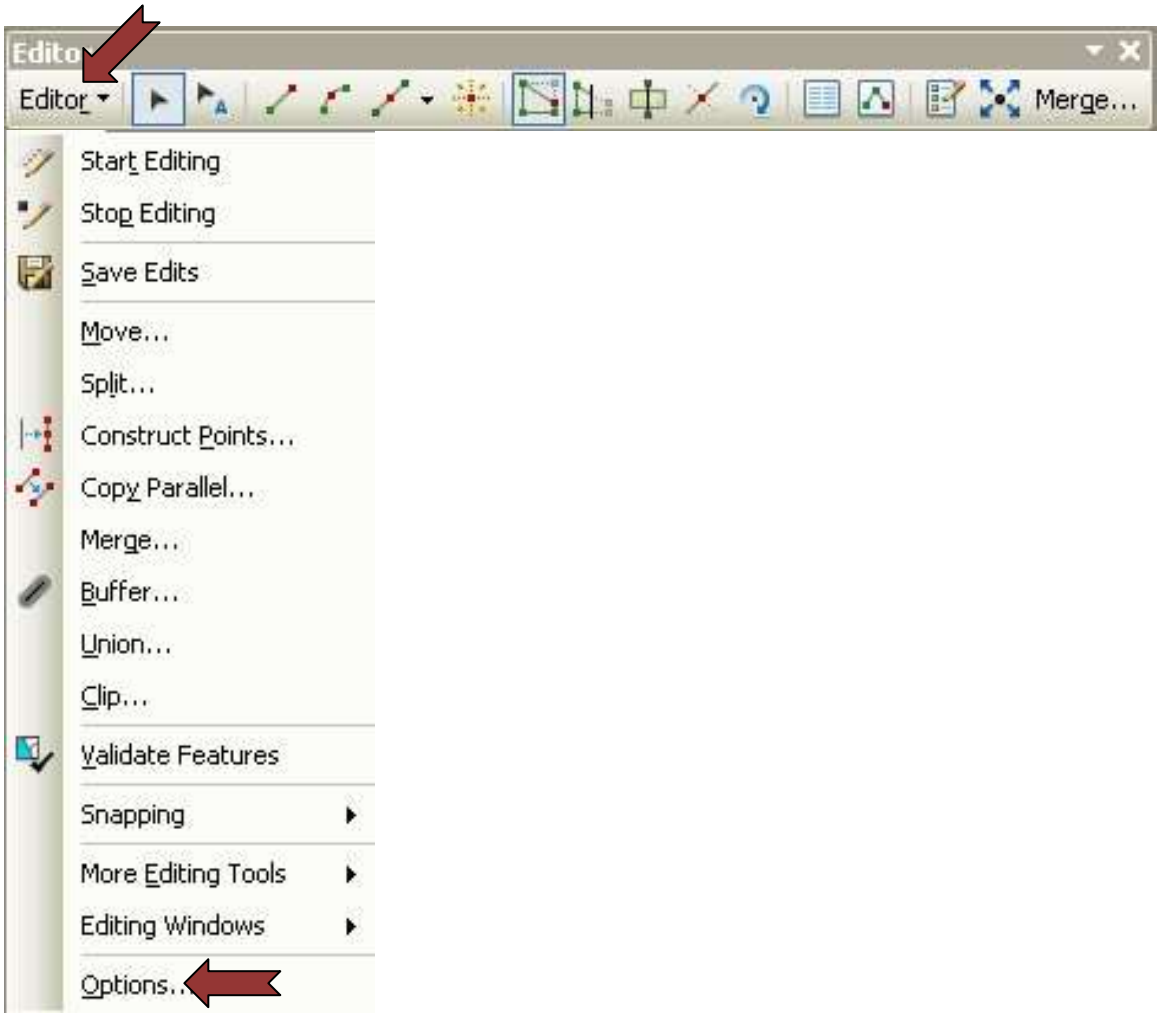
Open windows explorer and navigate to the K:\ArcReports\ then right click on the .pdf or .jpg map and from the drop down menu, select **Send To**. From the next drop down menu, click **Mail Recipient**. This will open Microsoft Outlook with an email message ready. Just type in the recipient's email and instructions and click Send. Do NOT send until office receives payment(s).



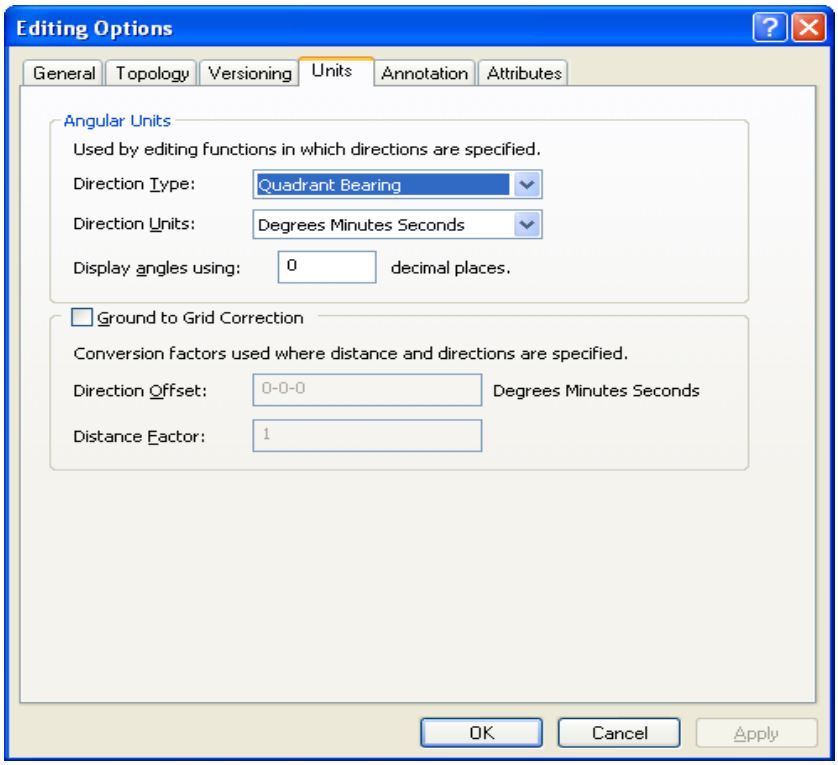
Users can also open Outlook or web email and attach the image to send to customers.

Using the COGO (Deed Plotter) Toolbar in ArcGIS 10

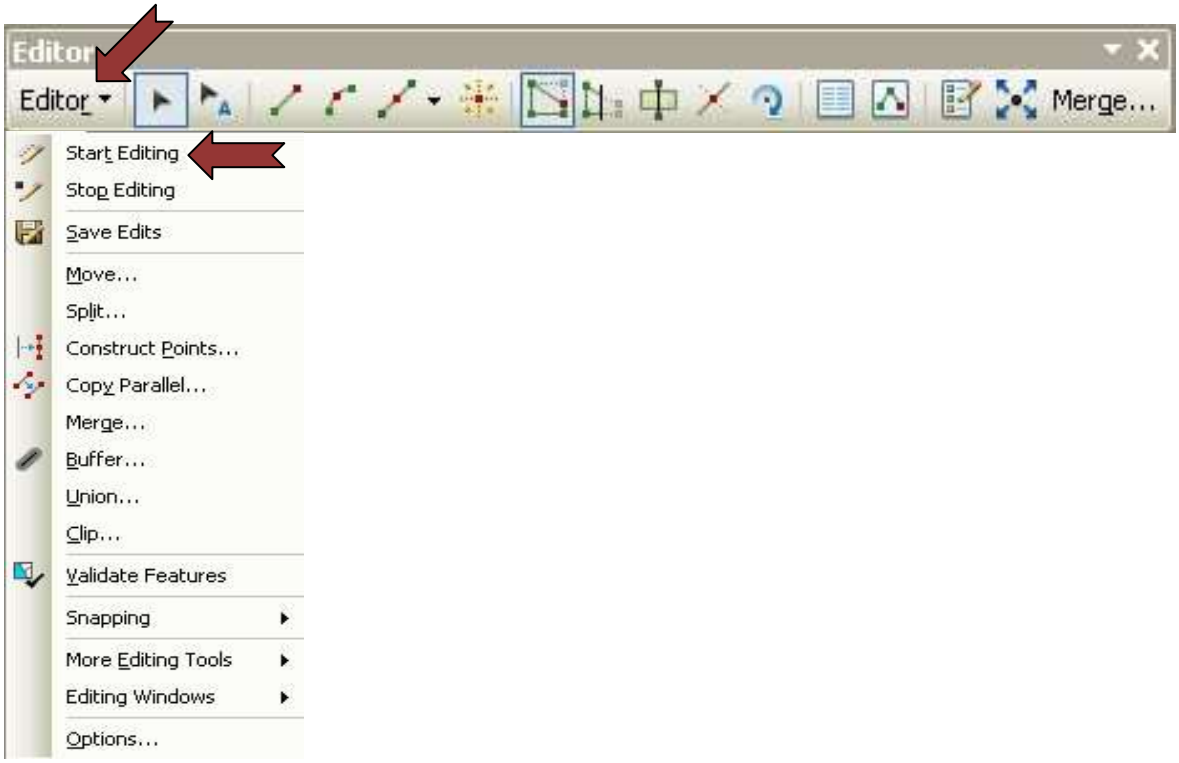
Consult the Help files in ArcGIS for complete instructions on using all of the COGO tools. For this lesson, begin by clicking the *Editor* dropdown tab on the *Editor* toolbar and click *Options…*
Note: Sets units in ArcGIS and save the project.



Click the *Units* tab, and under *Angular Units* choose *Quadrant Bearing* for *Direction Type*, then choose *Degrees Minutes Seconds* for *Direction Units*, and click OK

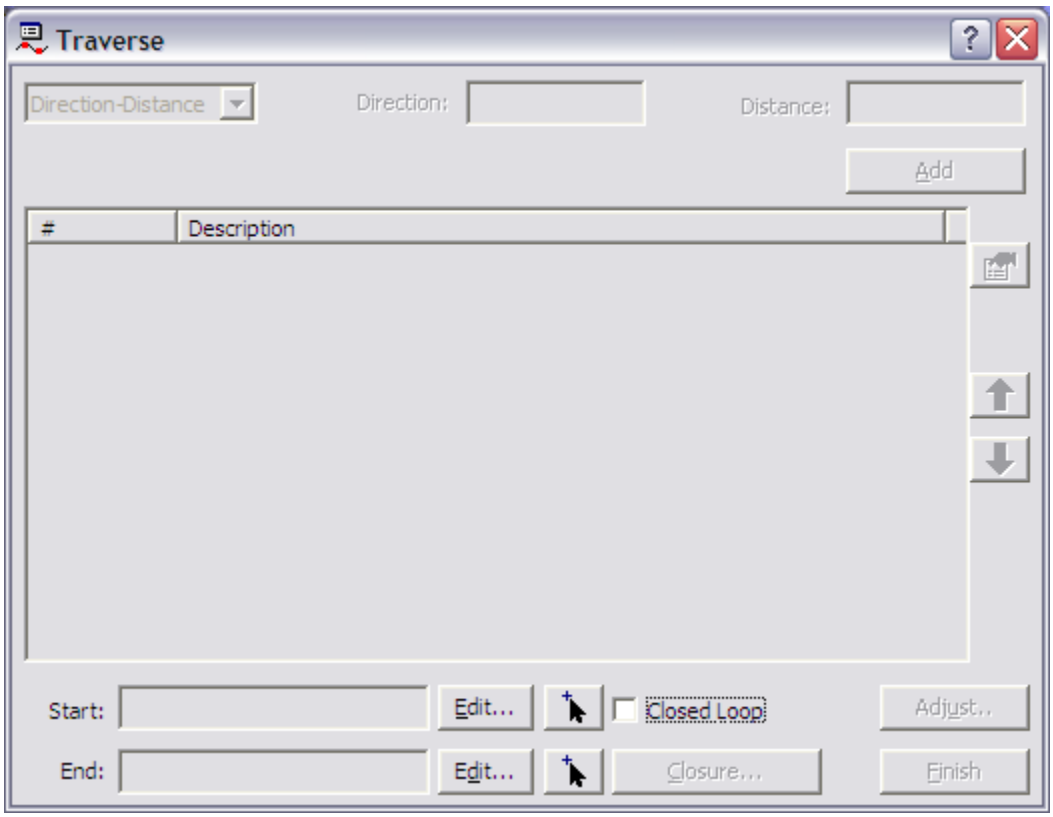


To get started using COGO, click the Editor drop down button, and click Start Editing. This will activate the COGO toolbar.



The ***Create Features*** box will appear when editing, select the target layer ***(Parcels)*** to insert the new COGO parcel.

Click the *Traverse* button  on the COGO toolbar. The Traverse window opens.



Click the ***Interactive Start Point Selection tool***  to set a start point by clicking on the map.

Click a point on the map to begin the Traverse.

Adding a segment to a traverse using a Direction-Distance course

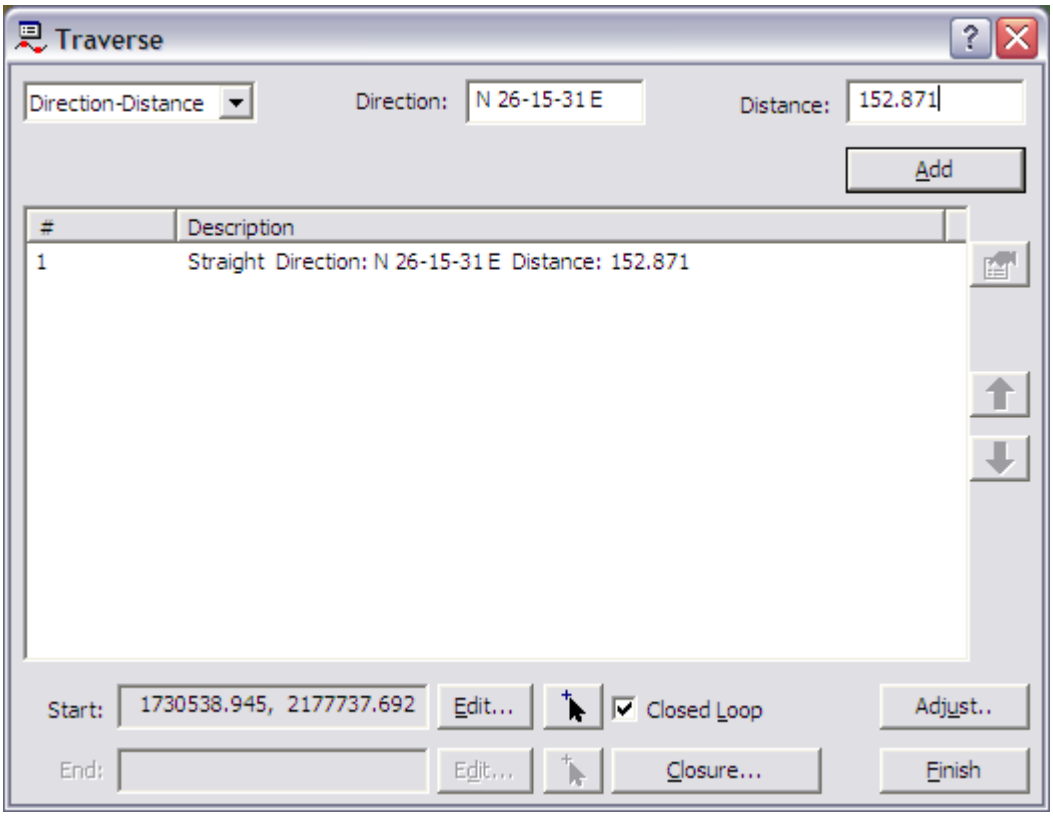
Click the *Course Type* drop-down arrow and click *Direction-Distance*.

Type a Direction: **N 26-15-31 E**

Type a Distance: **152.871**

The Traverse window uses the data frame's coordinate system units of measurement by default (Kentucky State Plane Feet). You can also use an abbreviation to enter different distance units (chains, rods, links, etc.). See appendix on “About Setting Distance Units” for more information.

Click *Add*.

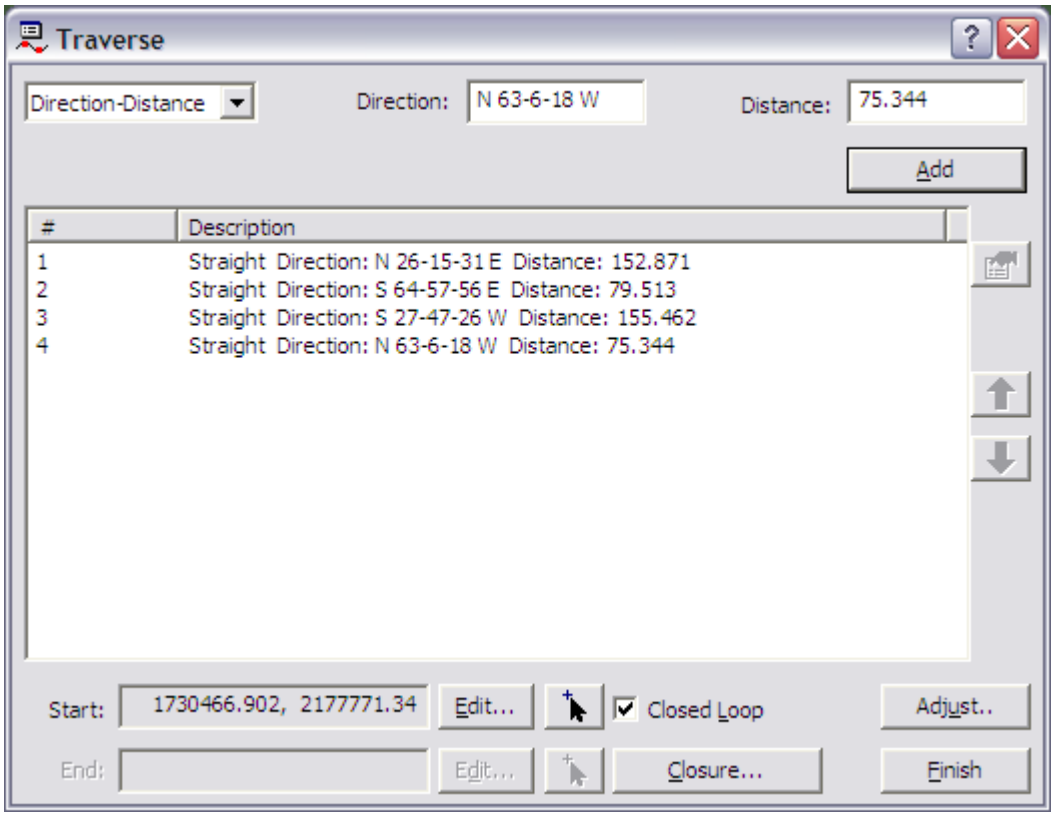


The course is added to the Course table, and the segment is added to the edit sketch.

Repeat the process entering the following calls:

S 64-57-56 E, 79.513
S 27-47-26 W, 155.462
N 63-6-18 W, 75.344

Check the ***Closed Loop*** option. This will close the Traverse as completed Parcel if the last call does not return to the starting point. In most cases it is best to have this checked as the end point is not always exactly the same as the starting point.



Right Click anywhere in the Traverse window then click ***Save Traverse…***

Navigate to K:\BoylePVA\ Deed Runner, then in the File Name type SUBDIV then click *Save*. This saves the Traverse as a .txt file for backup purposes.

Click **Finish** and the Traverse will be completed in the map display.

Once the deed calls are complete, click on the Edit Tool on the Editor toolbar. Left mouse click and hold down on the new parcel and drag the parcel to the desired location.

The next step is cutting the new parcel out of a larger parent parcel, select the COGO parcel, and from the ***Editor*** dropdown, select ***Clip*** (the Clip tool only works on a single parcel selected). This will open the Clip box, the ***buffer distance*** will stay ***0.00*** and the click the option ***Discard the Area that Intersects*** in the ***When Clipping Features*** area. This method prevents overlapping parcels.

To finish, enter in the attributes on the new parcel(s).

You can also double click on a parcel in the Data View area (or right mouse click on the selected parcel and select Edit Vertices), right mouse click in a clear area in the Traverse box and select load traverse from sketch. This will give you all the calls for that particular parcel.

Typing in the Distance in COGO (Deed Runner or Plotting)

Sometimes when creating features using the editing tools in ArcMap you need to enter data that was recorded in different distance units than the coordinate system of your data.

For example, suppose your data is in a State Plane coordinate system and the linear units are U.S. Survey Feet (1 Foot_US = 0.3048006096 m). You are given measurements in international feet (1 Foot = 0.3048 m). Rather than convert all the measurements, you can type the abbreviation for International Foot, "ft", after the measurements and the tools will convert the distance correctly. You could also change the dataset coordinate system definition to use International Feet and type the distances without a unit suffix.

Whenever you are typing a distance into one of the editing tools, you have the option to specify the linear units or simply type a number, which the tool will interpret as being in the dataset's coordinate system units. Distance unit abbreviations won't work, however, if your data frame is not projected—in other words, if your data frame is not using a projected coordinate system.

The following sections outline all the distance units supported in ArcMap and describe how to implement them.

Metric units

Distance units	Abbreviation	Meters per unit	Description
Kilometer	km	1000	1,000 meters exactly
Meter	m	1	International meter
Centimeter	cm	.01	1/100 meter exactly
Millimeter	mm	0.001	1/1000 meter exactly

Imperial or international units

Distance units	Abbreviation	Meters per unit	Description
Foot	ft	0.3048	Standard foot used in the U.S. Also known as international foot or imperial foot that was used in most nonU.S. countries before the metric system.
Mile	mi	1609.344	Also referred to as a statute mile, equal to 5280 international feet.
Nautical mile	nm	1852	The nautical mile is a unit of distance used primarily in sea and aviation. The nautical mile is defined as the average distance on the earth's surface represented by one minute of latitude. In 1929, the nautical mile was defined as exactly 1852 meters, or 6076.11549 feet, a distance known as the international nautical mile.

Chain	ch	20.1168	66 international feet
Yard	yd	0.9144	Three international feet
Rod	rd	5.0292	1/4 chain, or 16.5 international feet
Link	lk	0.201168	1/100 international chain, or 66/100 international feet
Inch	in	0.0254	1/12 international foot

U.S. survey units for Kentucky State Plane

Distance units	Abbreviation	Meters per unit	Description
Survey foot	ftUS	0.3048006096	The U.S. survey foot is used in the State Plane Coordinate Systems. In the U.S., fundamental survey units such as rods, chains, statute miles, acres, sections, and townships all depend on the U.S. survey foot. An exact conversion to meters can be accomplished by multiplying U.S. survey feet by the fraction 1200/3937.
Survey mile	miUS	1609.3472186944	5280 survey feet
Survey chain	chUS	20.1168402337	66 survey feet
Survey rod	rdUS	5.0292100584	1/4 survey chain
Survey link	lkUS	0.2011684023	1/100 survey chain
Survey yard	ydUS	0.9144018288	3 survey feet

Conversion constants

You can use conversion constants to convert from one measurement system to another. The measurement system to be converted should be multiplied by the associated conversion constant. For example, to convert feet to centimeters, multiply feet by the conversion constant of 30.48 (27 feet x 30.48 = 822.96 centimeters).
View a table of conversion constants
To view this document, you need a copy of Adobe Reader, which you can download free from http://www.adobe.com/products/acrobat/readstep.html.

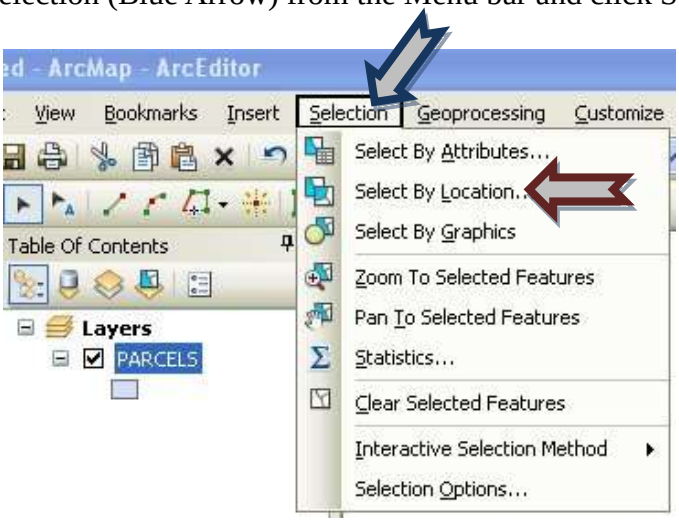
About the U.S. survey foot

In 1959, the directors of the National Bureau of Standards and the United States Coast and Geodetic Survey agreed on a redefinition of the inch–centimeter relationship. This redefinition defined 1 inch as equal to 2.54 centimeters exactly, or 1 foot as equal to 0.3048 meters exactly. However, their agreement stipulated that the older value for 1 meter equaling 39.37 inches exactly be retained for identifying the U.S. survey foot.
One of the reasons for this retention was that the State Plane Coordinate Systems, which are derived from the national geodetic control network, are based on the relationship of 1 meter equaling 39.37 inches exactly.

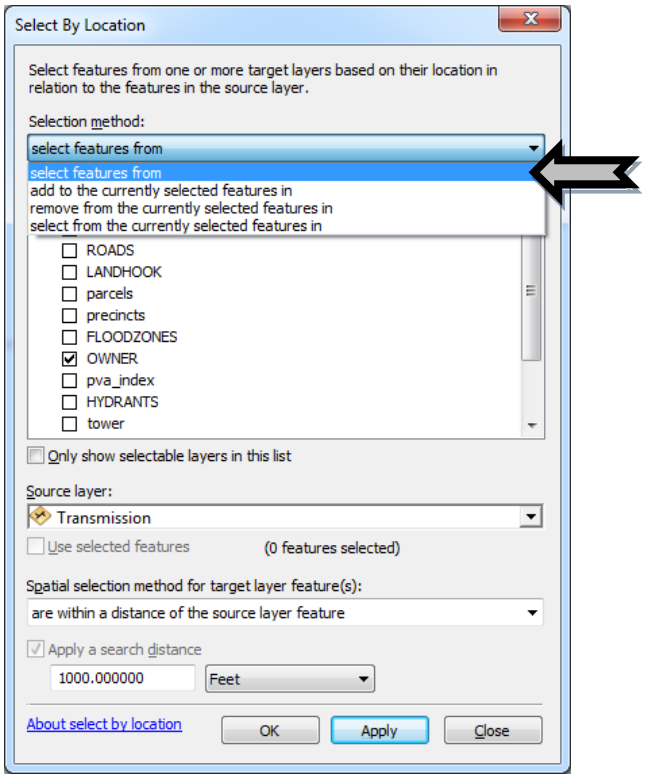
The difference between these two values for the foot is very small, two parts per million, which is hardly measurable, but not trivial when computational consistency is desired. Fundamental survey units, such as rods, chains, statute miles, acres, sections, and townships, all depend on the relationship of 1 meter equaling 39.37 inches exactly.
The U.S. survey foot table in the PDF represents the corrected values (or U.S. survey values), using the 39.37-inch conversion value.

How to select features by locations

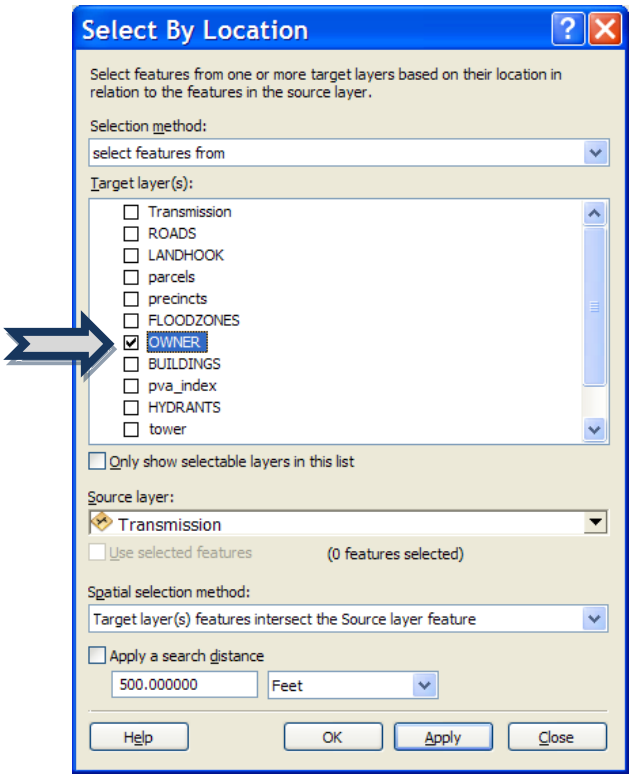
1. Click Selection (Blue Arrow) from the Menu bar and click Select By Location (Red Arrow).



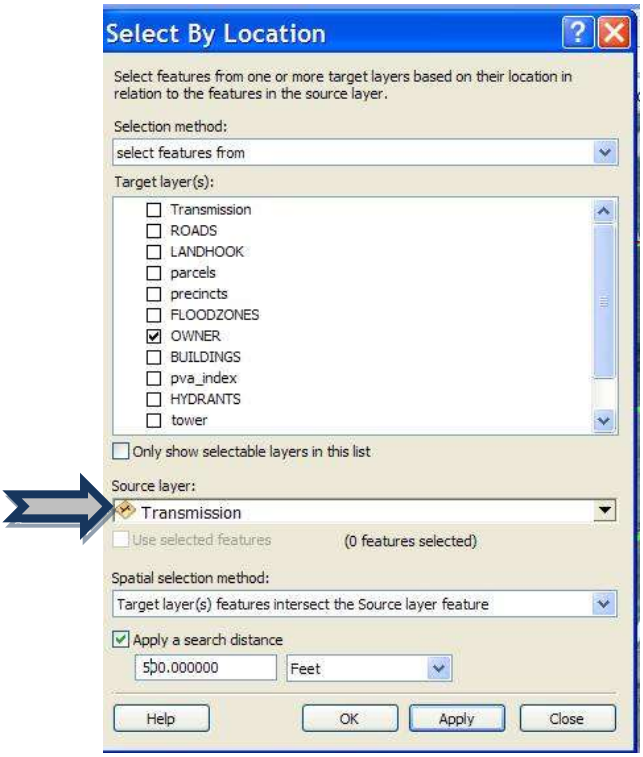
2. Click the drop-down arrow and click a selection method (Black Arrow).



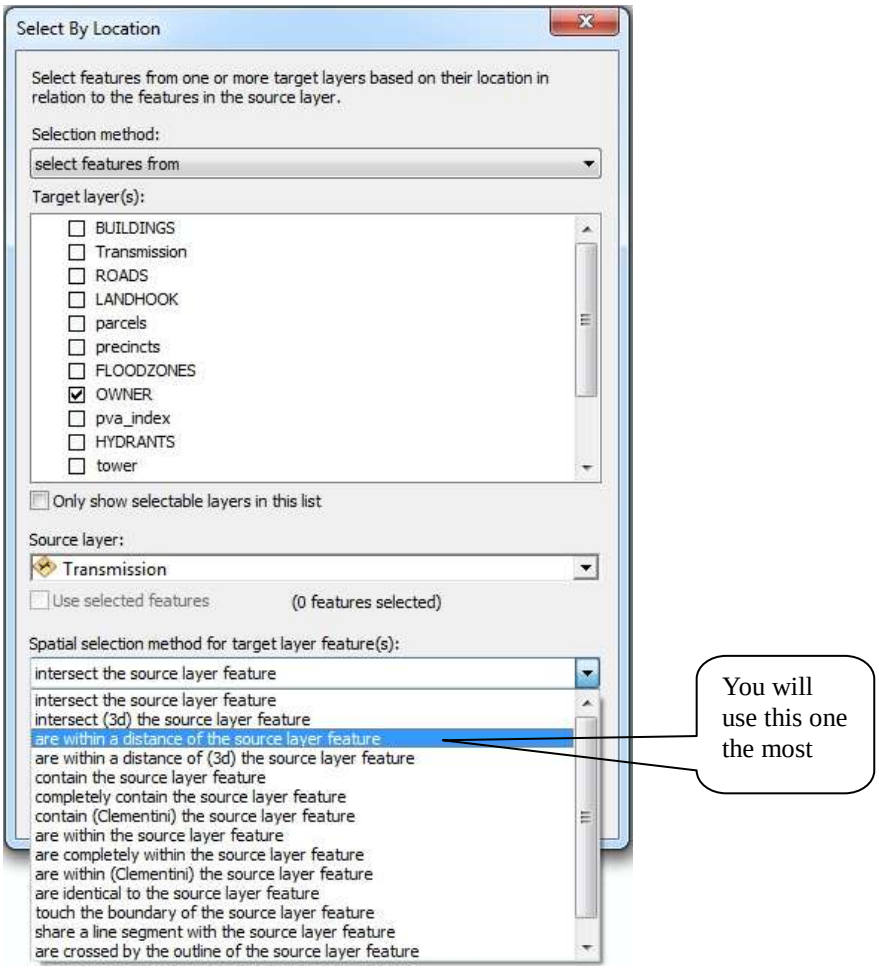
3. Check the layers whose features you would like to select (can be multiple features).



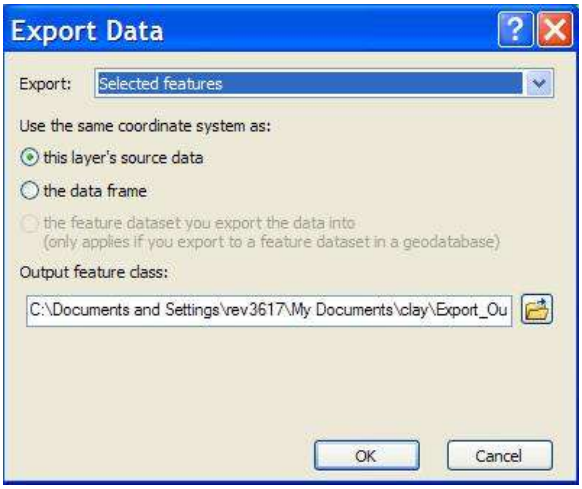
4. Click the drop-down arrow and click the layer you want to use to search for the features.



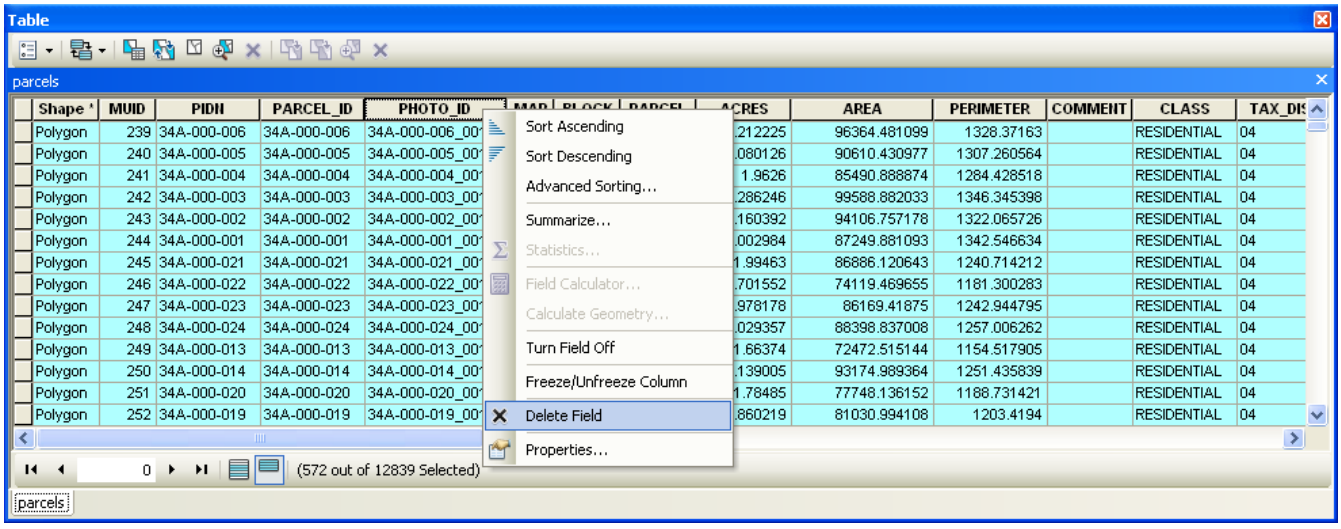
5. Click the drop-down arrow and click a selection method.



6. Optionally, check to use only the selected features.
7. Optionally, check ***Apply a Search Distance*** (buffer) to the features in layer (Transmission) and set the distance within which to search for features. (Ex.50 feet, 250 feet 500 feet, 1 mile, etc.)
8. Click OK if you want to execute the query and close the dialog box in one click.
9. Click Close when you've finished selecting features.
10. Export selected features by right clicking on the owner layer(or whichever layer the selection was in)drop down to the word data, export data



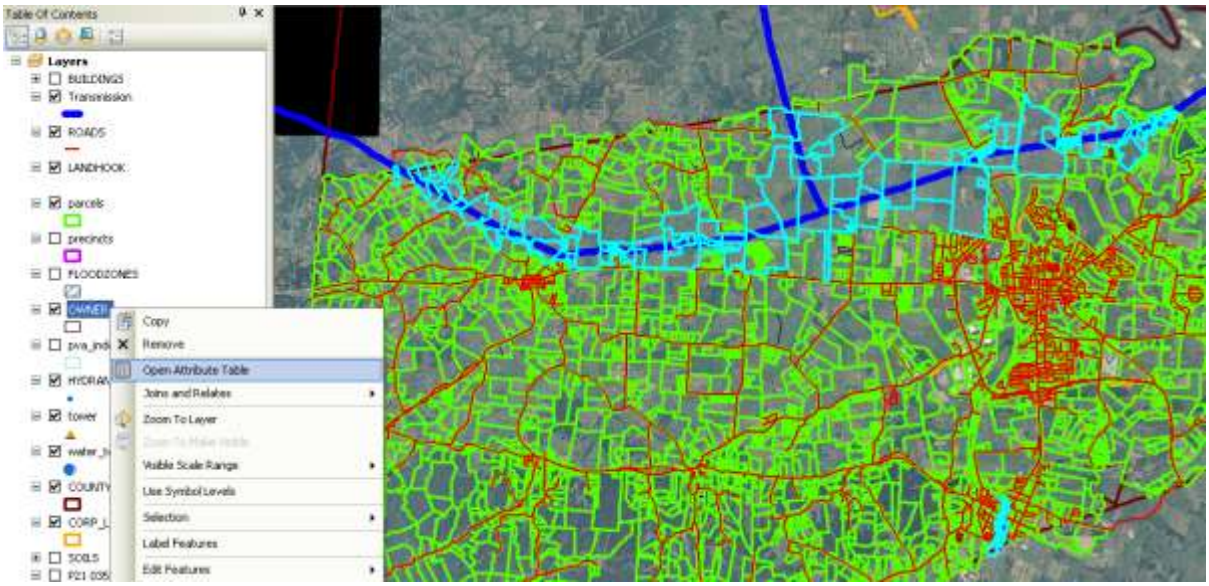
In this case you want to export selected features. (The drop down has an option to choose all features or the features in the data frame.) Output feature class-where you want to save (k:\arcreports\)name with the company requesting or any other name easily remembered. Click ok. You will get a question "do you want to add to project"? Normally you would say yes just to check that the selection is correct. You can also change the attribute table if you need to. Right click on the layer open attribute table, any field you do not want to send can be deleted at this time by right clicking on the field and clicking delete.



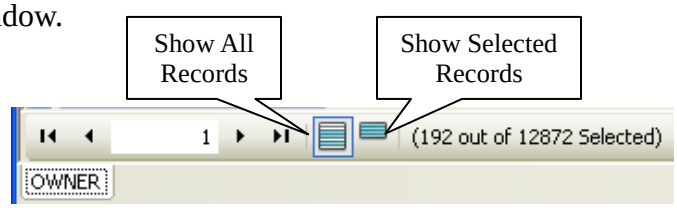
This can now be e-mailed or put on disk and sent to customer.

Creating Reports

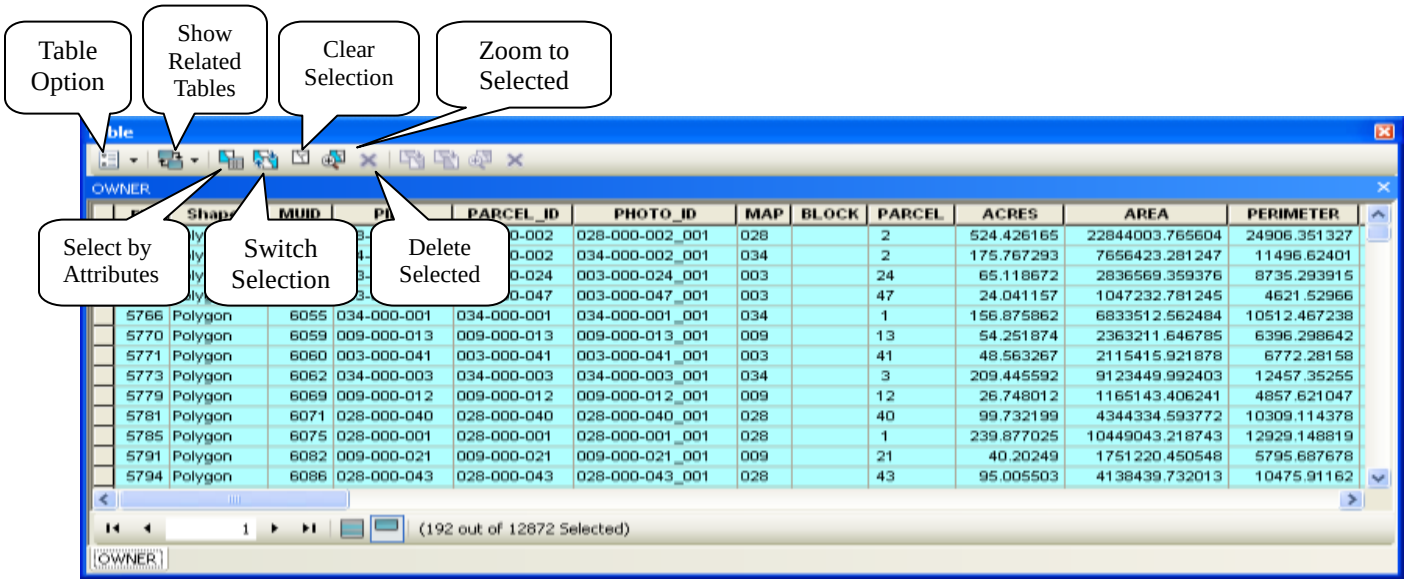
After a selection of parcels or any other layers in ArcGIS 10, a report can be generated. For this example, let's use the owner layer. To generate a report after a selection, right mouse click on the selected layer, and click on Open Attribute Table.



This will open the attribute table or the database for the owner layer or the selected layer. In the Attribute table, select whether to display all the records or only the records selected by two buttons near the bottom left of the window.

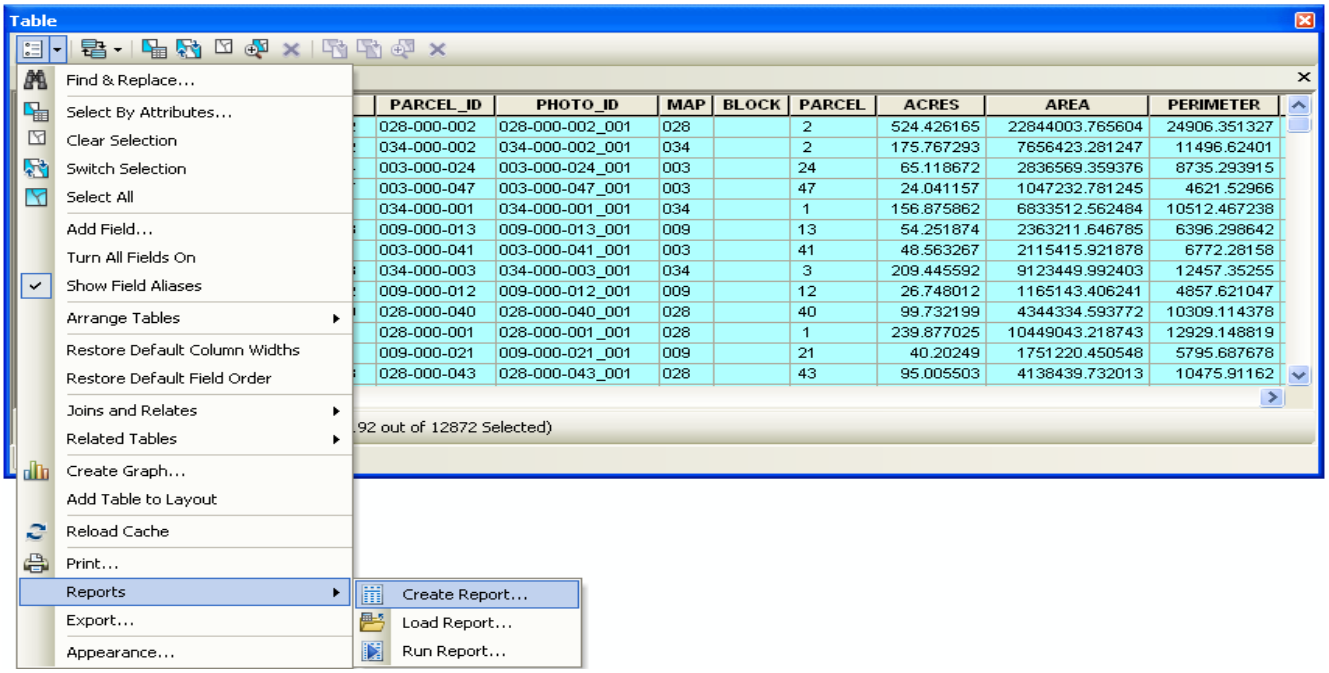


Click on the Show Selected Records button, this will display the selected parcels only.

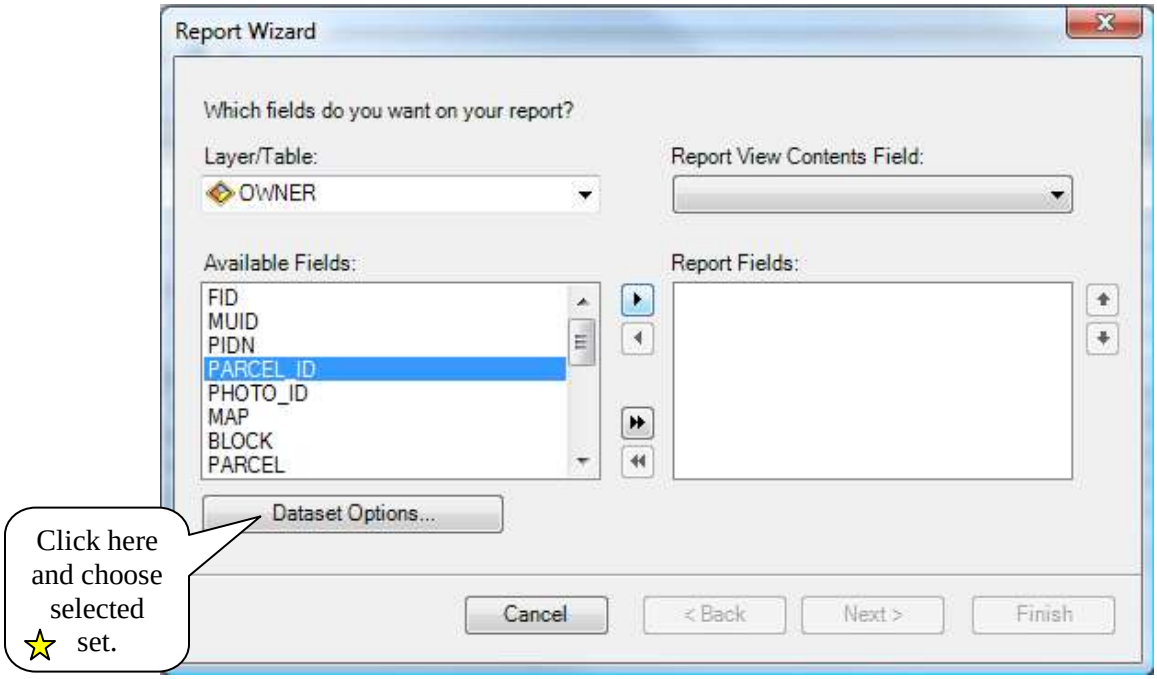


	Shape	MUID	PARCEL_ID	PHOTO_ID	MAP	BLOCK	PARCEL	ACRES	AREA	PERIMETER
			028-000-002	028-000-002_001	028		2	524.426165	22844003.765604	24906.351327
			034-000-002	034-000-002_001	034		2	175.767293	7656423.281247	11496.62401
			003-000-024	003-000-024_001	003		24	65.118672	2836569.359376	8735.293915
			003-000-047	003-000-047_001	003		47	24.041157	1047232.781245	4621.52966
5766	Polygon	6055	034-000-001	034-000-001_001	034		1	156.875862	6833512.562484	10512.467238
5770	Polygon	6059	009-000-013	009-000-013_001	009		13	54.251874	2363211.646785	6396.298642
5771	Polygon	6060	003-000-041	003-000-041_001	003		41	48.563267	2115415.921878	6772.28158
5773	Polygon	6062	034-000-003	034-000-003_001	034		3	209.445592	9123449.992403	12457.35255
5779	Polygon	6069	009-000-012	009-000-012_001	009		12	26.748012	1165143.406241	4857.621047
5781	Polygon	6071	028-000-040	028-000-040_001	028		40	99.732199	4344334.593772	10309.114378
5785	Polygon	6075	028-000-001	028-000-001_001	028		1	239.877025	10449043.218743	12929.148819
5791	Polygon	6082	009-000-021	009-000-021_001	009		21	40.20249	1751220.450548	5795.687678
5794	Polygon	6086	028-000-043	028-000-043_001	028		43	95.005503	4138439.732013	10475.91162

Next, click on the Table Options button in the top left of the Attribute Table.



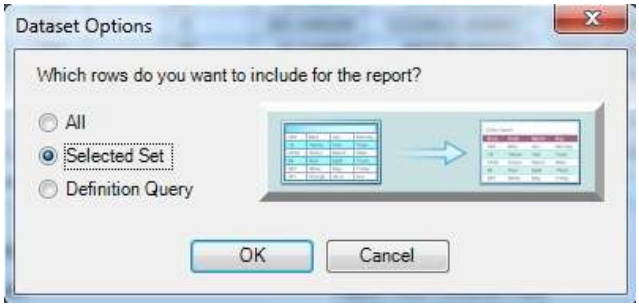
From the drop down menu, click Reports, and then Create Reports. This will start the Report Wizard window.

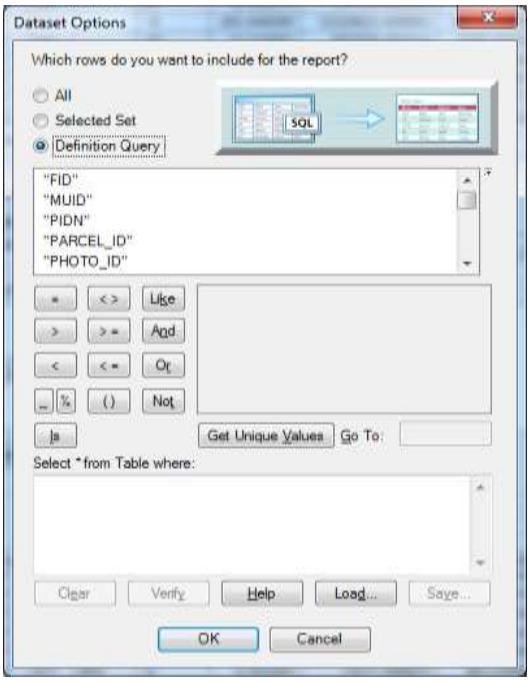


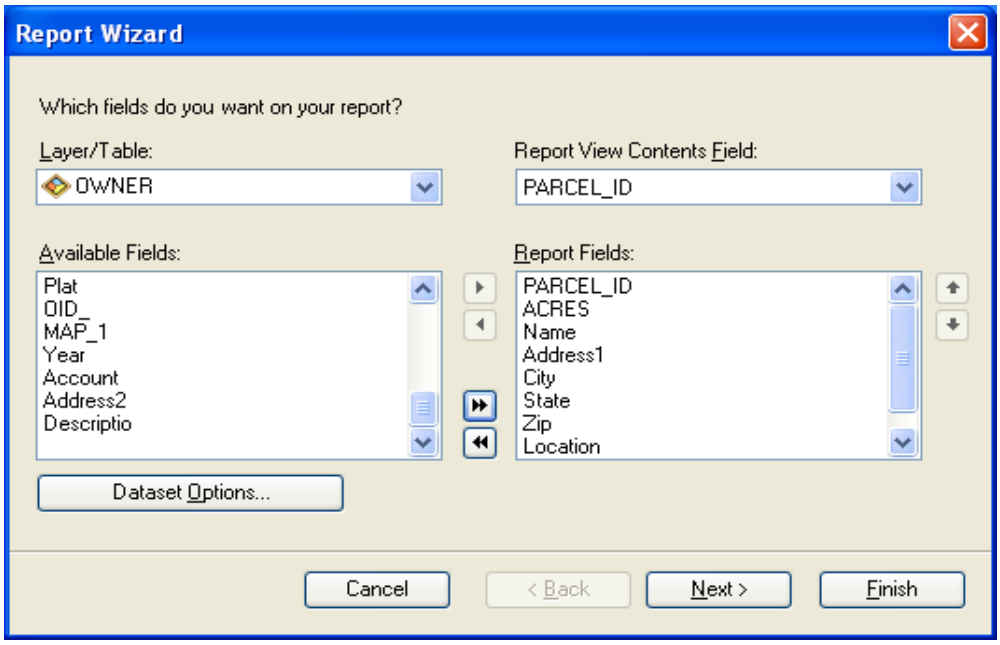
Select the layer/table needed for the report. Next, select each field of information and move into the Reort Fields box to the right by clicking the arrow pointed to the right. The double arrow moves all the data to either side. A report for adjacent parcels would contain:

Parcel_ID, Acres, Name, Mailing Address, City, State, Zip, Location, and Deed

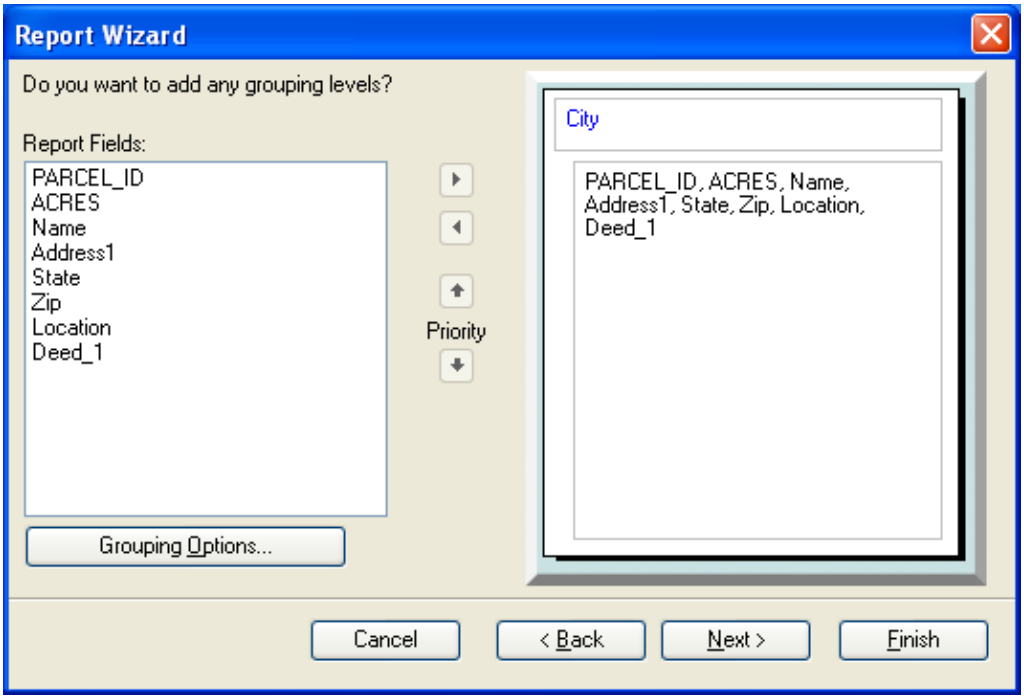
☆ The Dataset Options will allow users to use entire dataset (All, default), the Selected Set (below left), or to select features by data in the fields (below right).



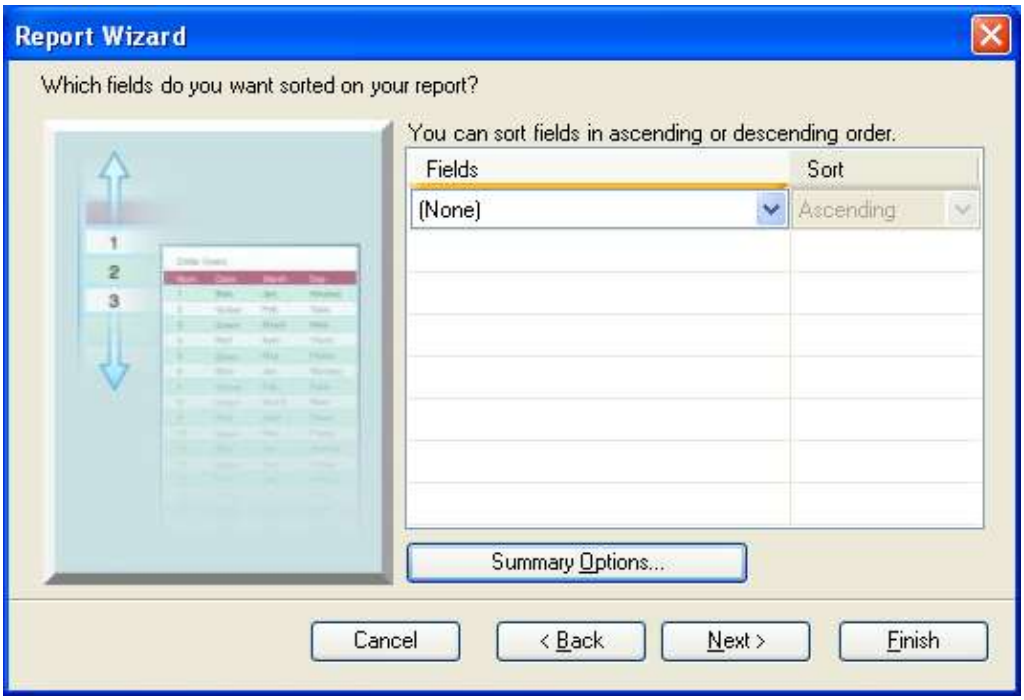




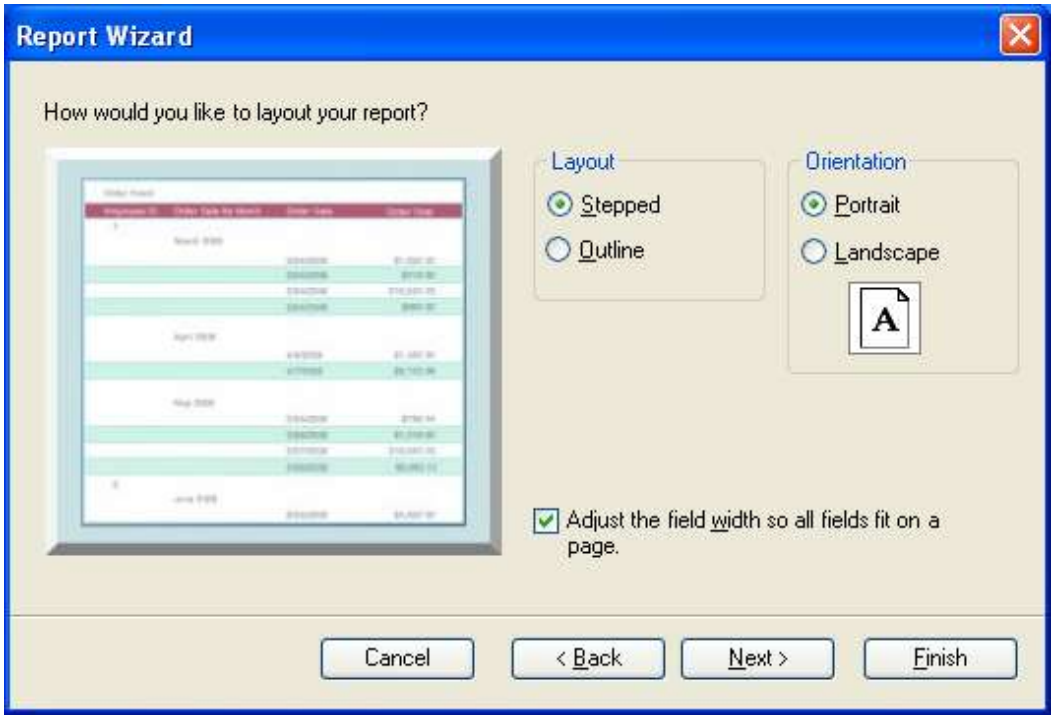
Click next after all report fields are moved into the Report Fields.
Click on the field that the report should to be grouped by such as street, owner, etc., then, click next. Note, this step can be skipped, grouping is not required.



Click the field that the report will be sorted by, owner name, size, or etc., you can skip this step by clicking next.

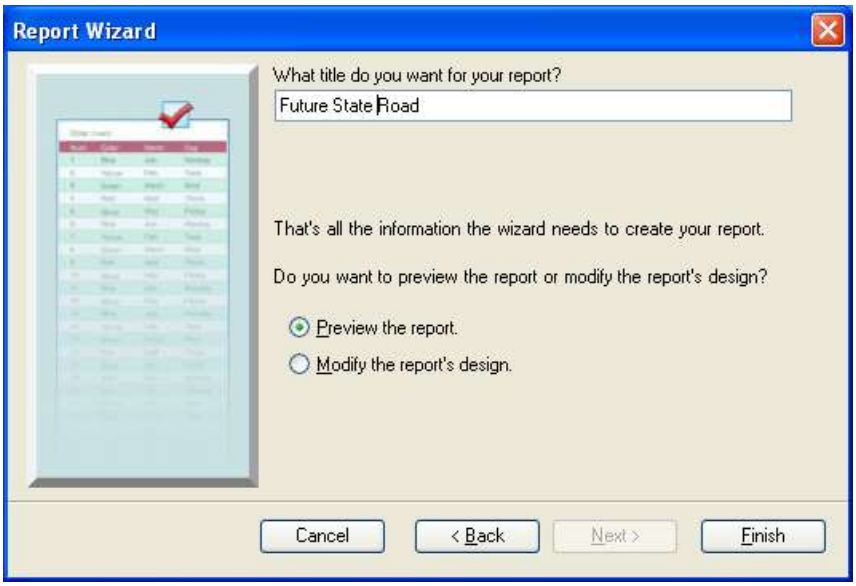


Choose how to layout the report, Stepped or Outline, also, click the paper orientation, then click next



Choose the style of report to print, you can skip this step.

Type in a name for the report created in the Title box of the Report Wizard window.



Click Finish, this may take a few seconds to a few minutes according to the number of records.

Watch the icon in the top right corner of the Report Viewer window for movement, this show that the report is being created.
Now, print the new report or save it as a .rdf file which can be used by Microsoft Word. You may also export to .PDF or .XLS format. This prints a very nice looking report. (See report below)

Explaining the different types of Selections

The Select By Location dialog box lets you select features based on their location relative to other features. For instance, if you want to know how many homes were affected by a recent flood and you mapped the flood boundary, you could select all the homes that are within the area. Answering this type of question is known as a spatial query.

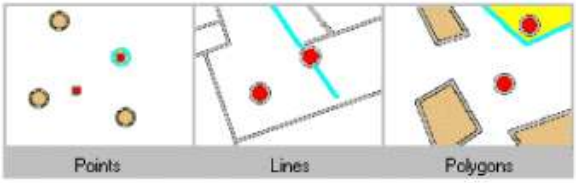
You can use a variety of selection methods to select the point, line, or polygon features in one layer that are near or overlap the features in the same or another layer.

Intersect

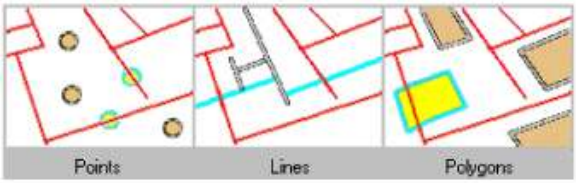
Intersect is the most generic operator. As its name implies, it will return any feature that geometrically shares a common part with the source feature (or features).
There are a few other operators that are equivalent to intersect for specific uses, for instance

- Are identical to, when comparing point features
- Are within a distance of, when specifying no buffer or a buffer of zero

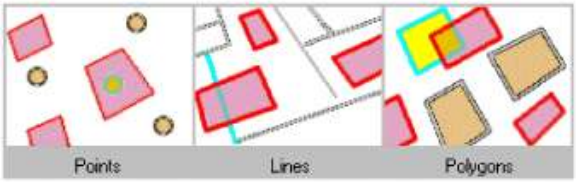
When finding features that intersect with point features



When finding features that intersect with line features



When finding features that intersect with polygon features

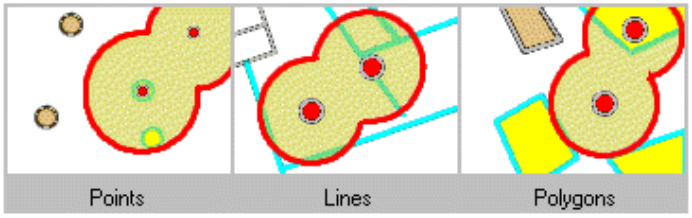


The highlighted cyan features are selected because they intersect the red features.

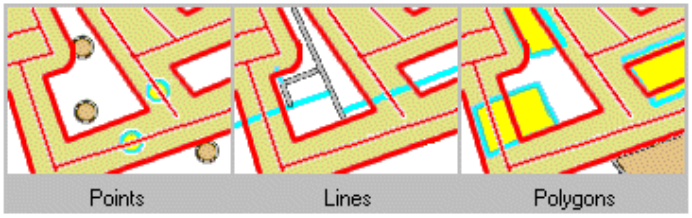
Are within a distance of

The Are within a distance operator creates a buffer (or buffers) with a size equal to the distance specified around the source feature (or features), then returns all the features intersecting the buffer (or buffers).
Its typical use would be to retrieve cities within a distance of a river or railroad, shops or businesses within a distance of a town, and so on.

When finding features that are within a distance of point features



When finding features that are within a distance of line features



When finding features that are within a distance of polygon features

The highlighted cyan features are selected because they are within the selected distance of the red features.

Completely contain

For a feature to be considered as completely containing another feature, each point in the geometry of the source feature must fall inside the geometry of the target feature, excluding its boundaries. For instance, a polygon representing the United States will completely contain the state of Kansas but not Texas, because the southern Texas boundaries overlap the country boundary.
The target feature must be a polygon.

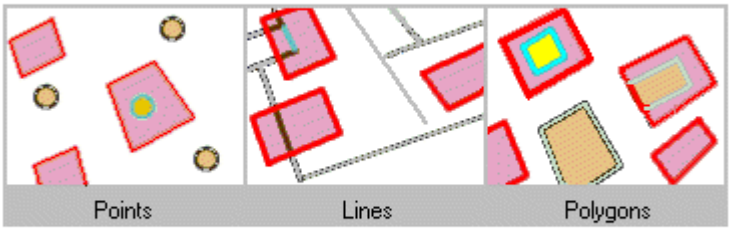
When finding point, line and polygon features completely contained by polygon features

The highlighted cyan features are selected because they completely contain the red features.

Are completely within

For a feature to be considered as being completely within another feature, each point in the geometry of the target feature must fall within the geometry of the source feature excluding its boundaries. This is the reverse operator from Completely contain. For instance, when using this operator, Wyoming is completely within the United States but Montana is not, as its northern boundaries overlap that of the country.
The source feature must be a polygon or you must apply a buffer around point and line features to use this operator.

When finding features that are completely within polygon features

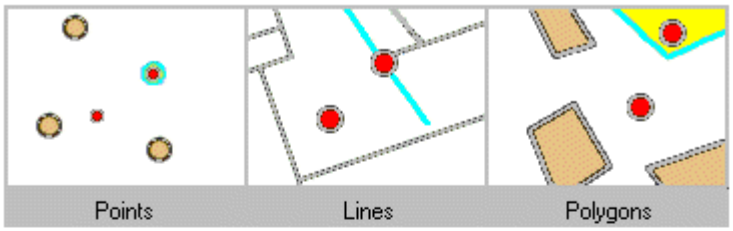


The highlighted cyan features are selected because they are completely within the red features.

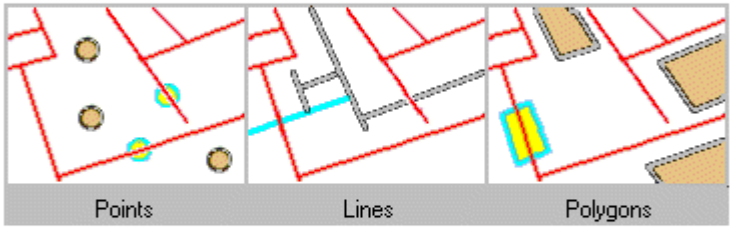
Have their center in

A target feature will be selected by this operator if the centroid of its geometry falls into the geometry of the source feature or on its boundaries.

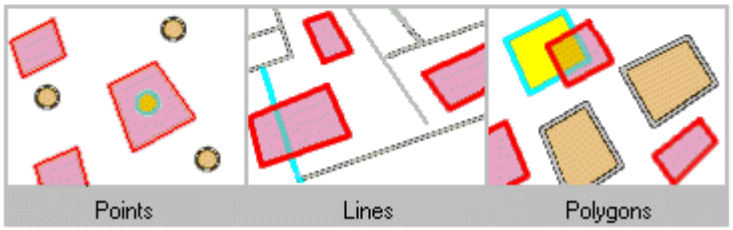
When finding features that have their centers within a distance of point features



When finding features that have their centers within a distance of line features



When finding features that have their centers within a distance of polygon features

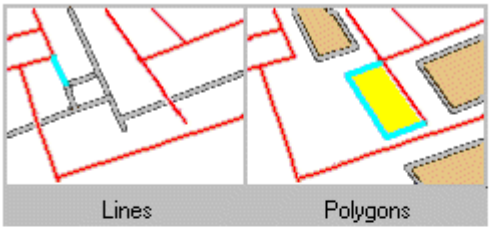


The highlighted cyan features are selected because they have their centers in the red features.

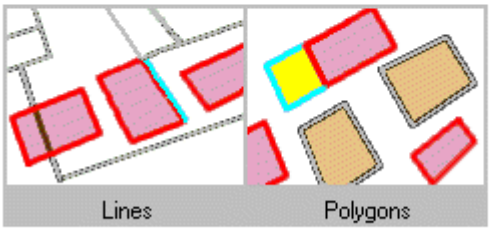
Share a line segment with

With this method, the source and target features will be considered as sharing a line segment if their geometries have at least two contiguous vertices in common.
The source and target features must be either lines or polygons.

When finding features that share a line segment with line features



When finding features that share a line segment with polygon features



The highlighted cyan features are selected because they share a line segment with a red feature.

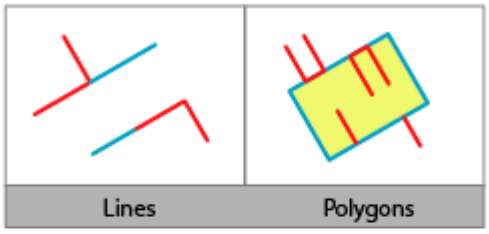
Touch the boundary of

The source and target features must be either lines or polygons.

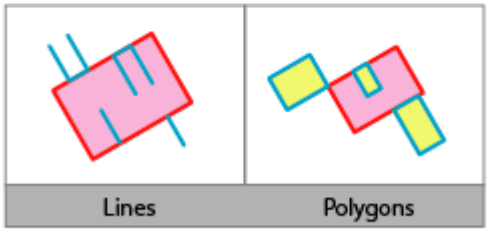
A target feature will be returned by this function if the intersection of its geometry with the geometry of the source feature is non-empty, but the intersection of their interiors is empty. This is the definition of the Clementini touch operator, so if the target feature touches (as defined by Clementini) the source feature, it will be returned by this function.

But an additional case is also considered: a polyline or a polygon completely within a polygon will also be returned by the function if its geometry shares line segments, vertices, or endpoints with the boundary of the polygon.

When finding features that touch the boundary of line features



When finding features that touch the boundary of polygon features

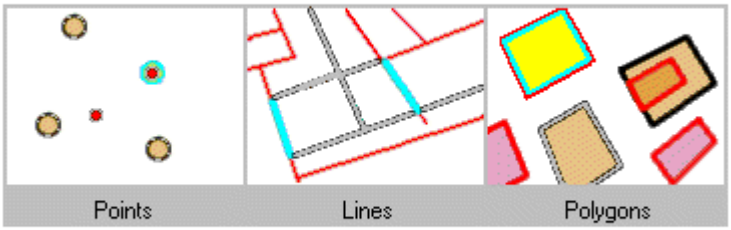


The highlighted cyan features are selected because they touch the boundary of a red feature.

Are identical to

Two features are considered identical if their geometries are strictly equal. The feature types must be the same—for instance, you can use this operator to compare two polygon layers, but comparing a point layer and a polygon layer for identity will always return an empty selection.

When finding features that are identical to other features

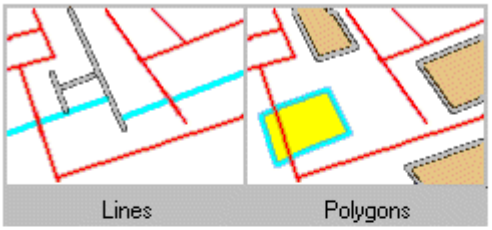


The highlighted cyan features are selected because they are identical to a red feature.

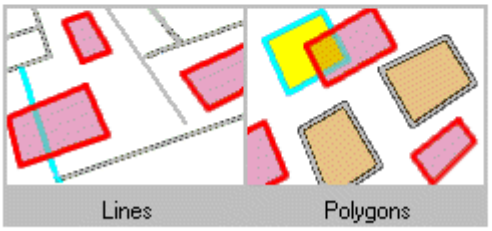
Are crossed by the outline of

For this operator, the boundaries of the source and target feature must have at least one edge, vertex, or endpoint in common but must not share a line segment.
The source and target features must be either lines or polygons.

When finding features that are crossed by the outline of line features



When finding features that are crossed by the outline of polygon features

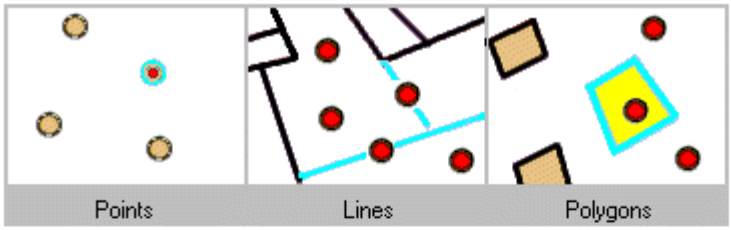


The highlighted cyan features are selected because they intersect the red features.

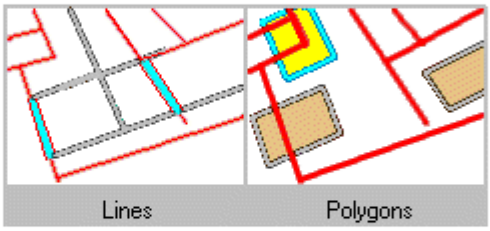
Contain

This method differs from the Completely contain method in that the geometry of the source feature must fall inside the geometry of the target feature including its boundaries.
A polygon representing the United States will contain the state of Texas even though their boundaries overlap along the southern border of the country.
The target feature must be a polygon.

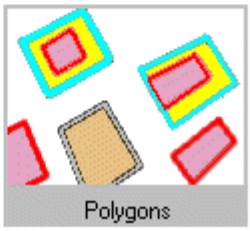
When finding features that contain point features



When finding features that contain line features



When finding features that contain polygon features

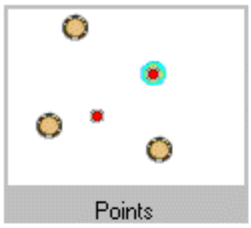


The highlighted cyan features are selected because they contain a red feature.

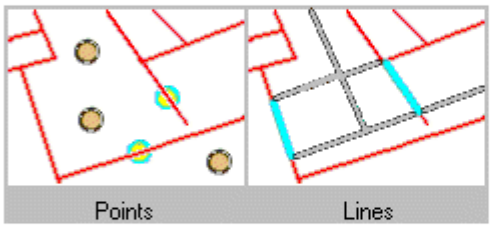
Are contained by

This method differs from the Are completely within method in that the geometry of the target feature must fall inside the geometry of the source feature including its boundaries.
For example, using this operator, the state of Montana will be selected even if its boundaries partly overlap that of the country.

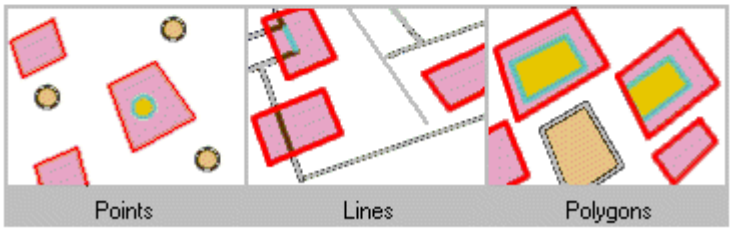
When finding features that are contained by point features



When finding features that are contained by line features



When finding features that are contained by polygon features



The highlighted cyan features are selected because they are contained by a red feature.

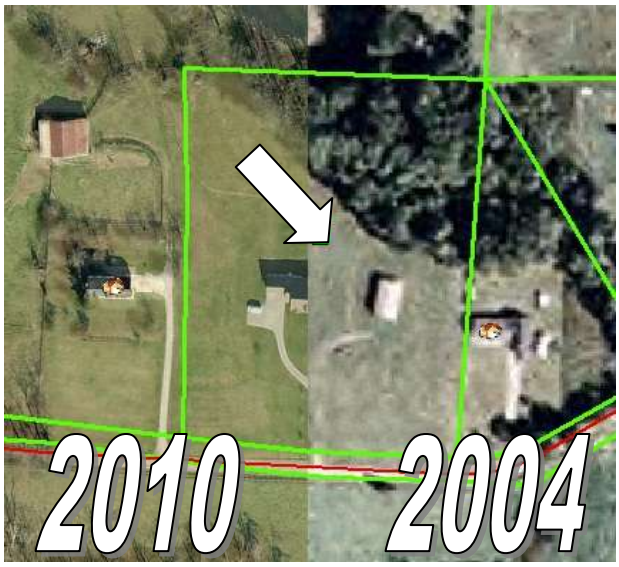
Working with the Effects Toolbar

The effects toolbar allows users to compare different aerials or layers by a number of different tools. These tools are excellent ways of finding what year a structure was built. The Commonwealth of Kentucky has aerials photos flown every two years, 2002 – 2012.

The Layer box is a drop down of features to select from the ArcGIS Project. Select the layer or aerial to compare to all other layers in the project.

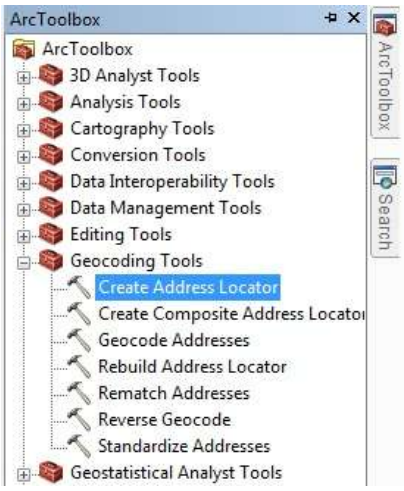
Adjust Contrast	Adjust the contrast of the selected layer.
Adjust Brightness	Adjust the brightness of the selected layer.
Adjust Transparency	Adjust the percentage of the layer's transparency
Adjust Dim Level	Allows users to set a dim level for a base map that enables other layers to more visible.
Swipe Layer	Allows a user to interactively peel the selected layer from side to side or up and down in the viewing area to see and compare other layers or aerials.
Flicker Layer	Allows users to have the selected layer blink on and off continuously. The speed of blinking is determined by number to the right of the button. The lower the number, the faster and higher the slower it will blink.

The Effects toolbar can be useful changing how different layers or aerials appear in ArcGIS. For PVAs, the Swipe tool will be the most useful. It will allow users to compare the same area of different year aerials for a county to check what year structures were built or improvements were added.



Using the GeoCoding toolbar to Create and Find Addresses.

Before using the Geocoding toolbar, a county must have road centerlines with a name field (with Directional, Name, and Suffix Type), address field (on Road Side), and a distance field for each road segment. In ArcMap, open the ArcToolbox located on the right side of the Data View (or click on the ArcToolbox button located on the Standard Toolbar.)

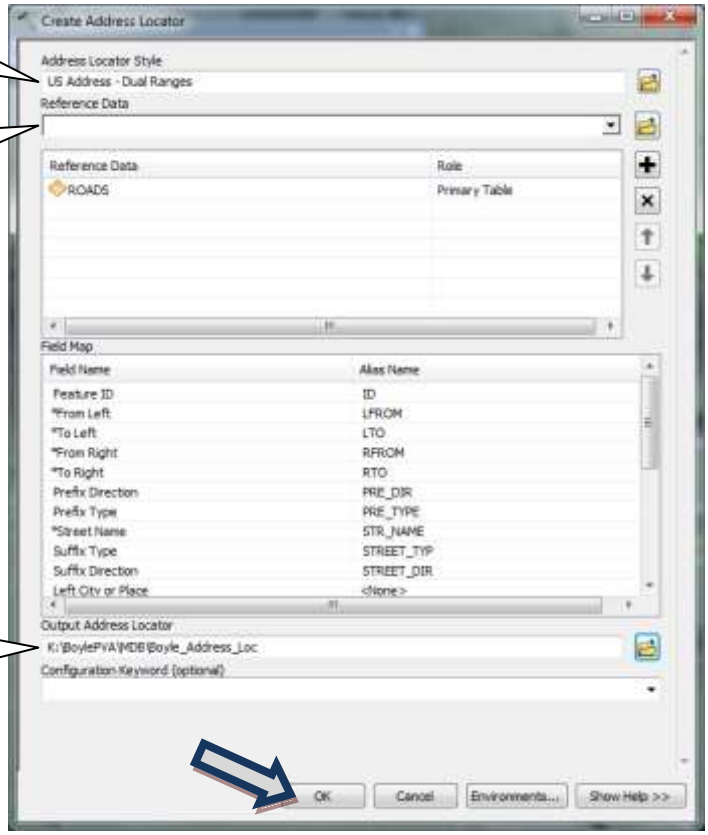


Click the plus sign to the left of Geocoding Tools, then double click the Create Address Locator tool from the list of tools. Fill in the needed fields in the Create Address Tool window.

Select ***US Address – Dual Ranges***

Select ***Roads*** from the drop down menu

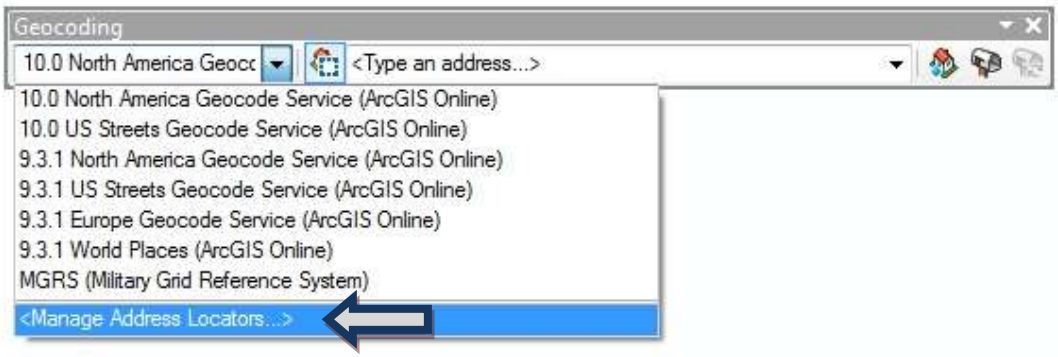
Save the locator file in ***K:\CountyPVA\MDB***



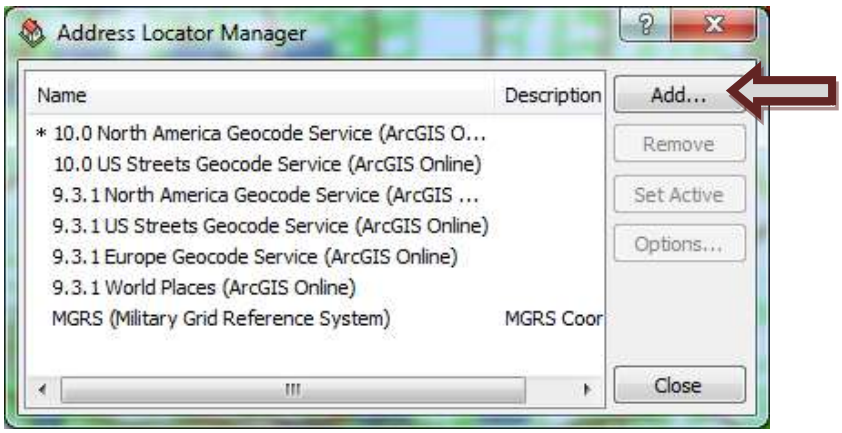
After the important field names are matched under field map, such as:

-From Left	LFROM
-To Left	LTO
-From Right	RFROM
-To Right	RTO
-Street Name	STR_NAME
-Left City or Place (Optional)	COMM_L
-Right City or Place (Optional)	COMM_R
-Distance (or Length)	Located in database

Click the OK button (blue arrow), it may take a few minutes to process depending the number of roads in the county. After it completes, click Close. After the process is complete, double click in the GUI, and check the box left of Geocoding. The box below should be activated.

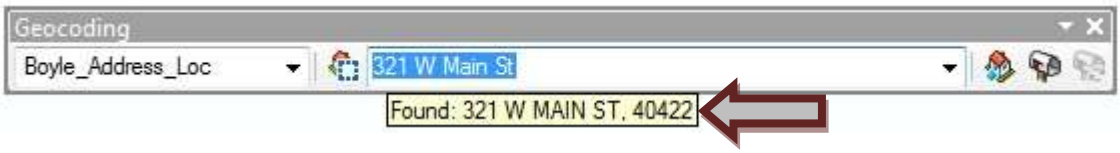


From the drop down menu click Manage Address Locator. This will open the Address Locator Manager window, click the Add button on the right to add the locator file located at: K:\BoylePVA\MDB/Boyle_Address_Loc.loc.

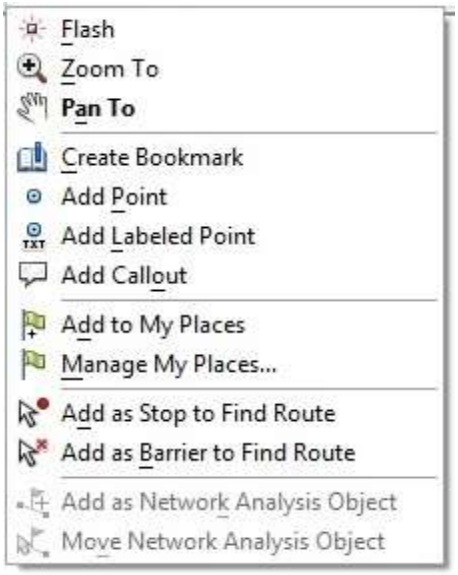


Address Inspector	Click on a map and get the address of the location (Reverse Geocode)
Geocode Addresses	Creates points from a table of addresses added to ArcGIS.
Review/ Rematch Addresses	Allows user to match, unmatch, and rematch addresses positions.
Use Map Extent	Use the current map extent when finding locations.

The address of the Boyle County Courthouse is 321 West Main Street. Type in the address and hit enter to see the box below displayed.



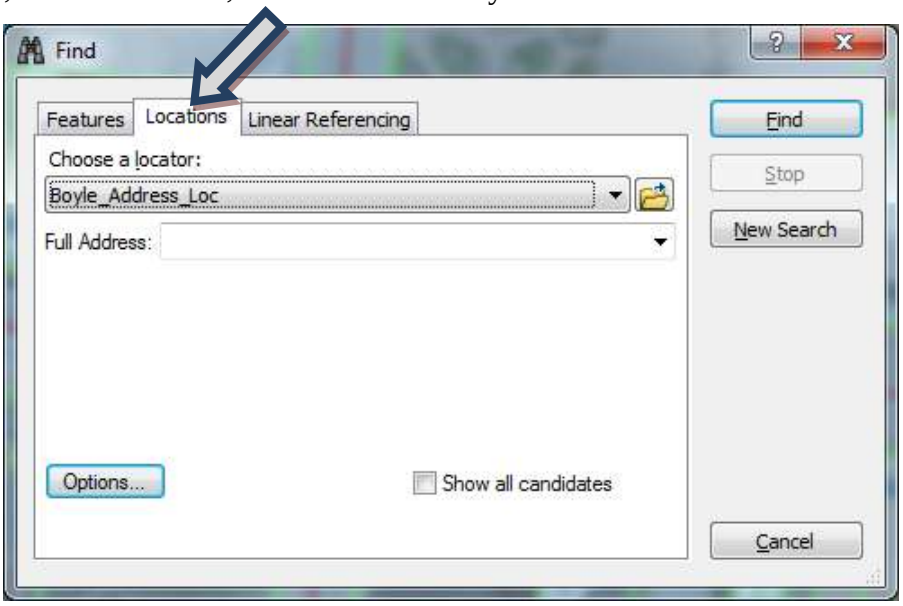
After the Found box is displayed, right mouse click on the address highlighted in blue. This will create another dropdown list. (See drop down on next page.)



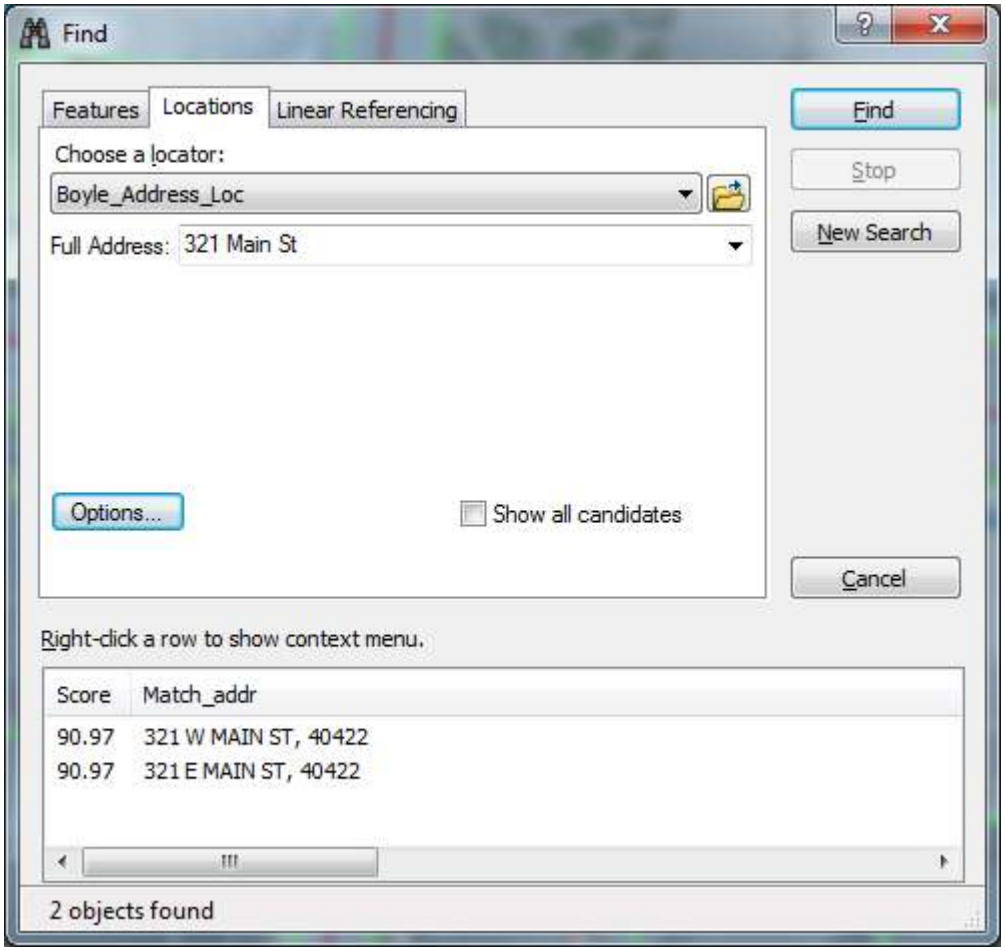
Flash the entire property a solid green color.
Zoom to closest level with the entire feature in view area.
Pan to selected feature at current scale or extent.

Save a reference screen position for easy access of visual data.
Creates a light green point at the addressed position.
Creates a light green point at the addressed position and text.
Creates the address text in a white comment box.

After setting up the geocoding tools, address searches can be done by using the Find tool  . Click on the Find tool, located on the Tools toolbar. This will open the Find box. Click on the Locations tab to do an address search. Choose a locator first, County_Address_Loc, then type in the address in the Full Address field, 321 Main Street, and hit the enter key or click the Find button.



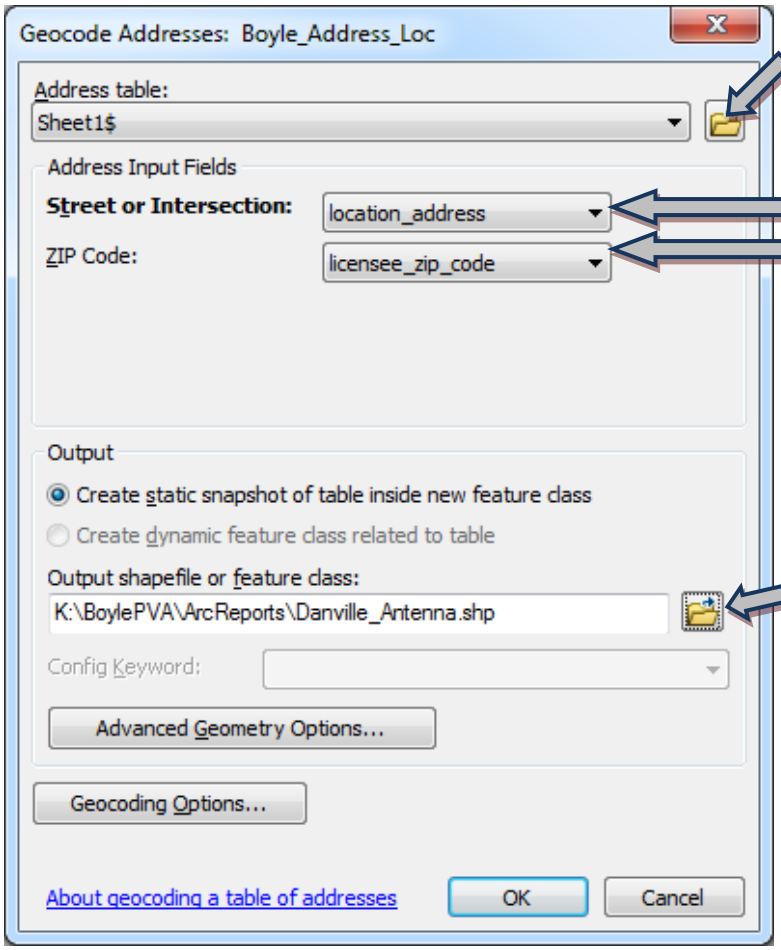
This will display all available address location in the county. This will display multiple addresses if directional or street types left off.



More examples:

321 Main Street	Courthouse (1)
300 5th St.	Multiple Address (2)
400 4th St.	Multiple Address (3) School Additions
100 2nd St.	Multiple Address (4) Test for full address
159 Old Bridge Rd	Mobile Home
919 Hustonville Rd	Mexican Restaurant

ArcGIS can create points from an excel spreadsheet using the Geocode Address button. For this example, we downloaded a spreadsheet from www.AntennaSearch.com to find cellular antenna location data in a county. This will generate a file to download including location address, elevation, latitude and longitude. Click on the Geocode Address button and select the Boyle_Address_Loc locator file from the dropdown list, Click OK. This will open the Geocode Addresses box.

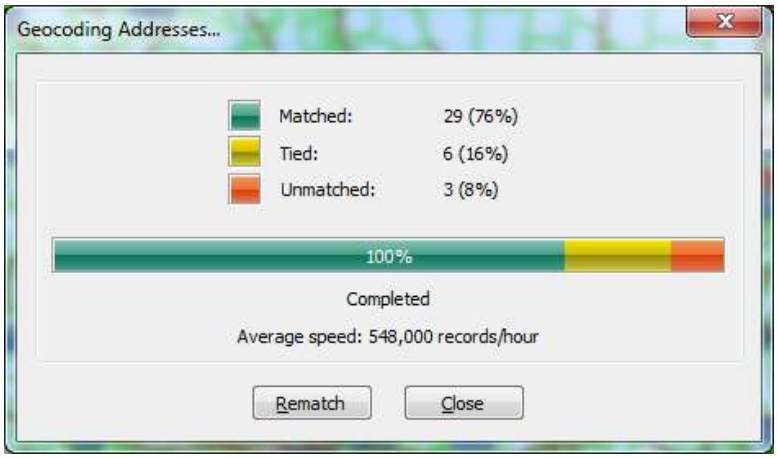


Load the spreadsheet by clicking the Address Table folder button and locate the file and table.
K:\BoylePVA\MDB\Antenna_Exercise.xls

Field with Full Address
Zip Code (Optional)

Location of the new SHP file.

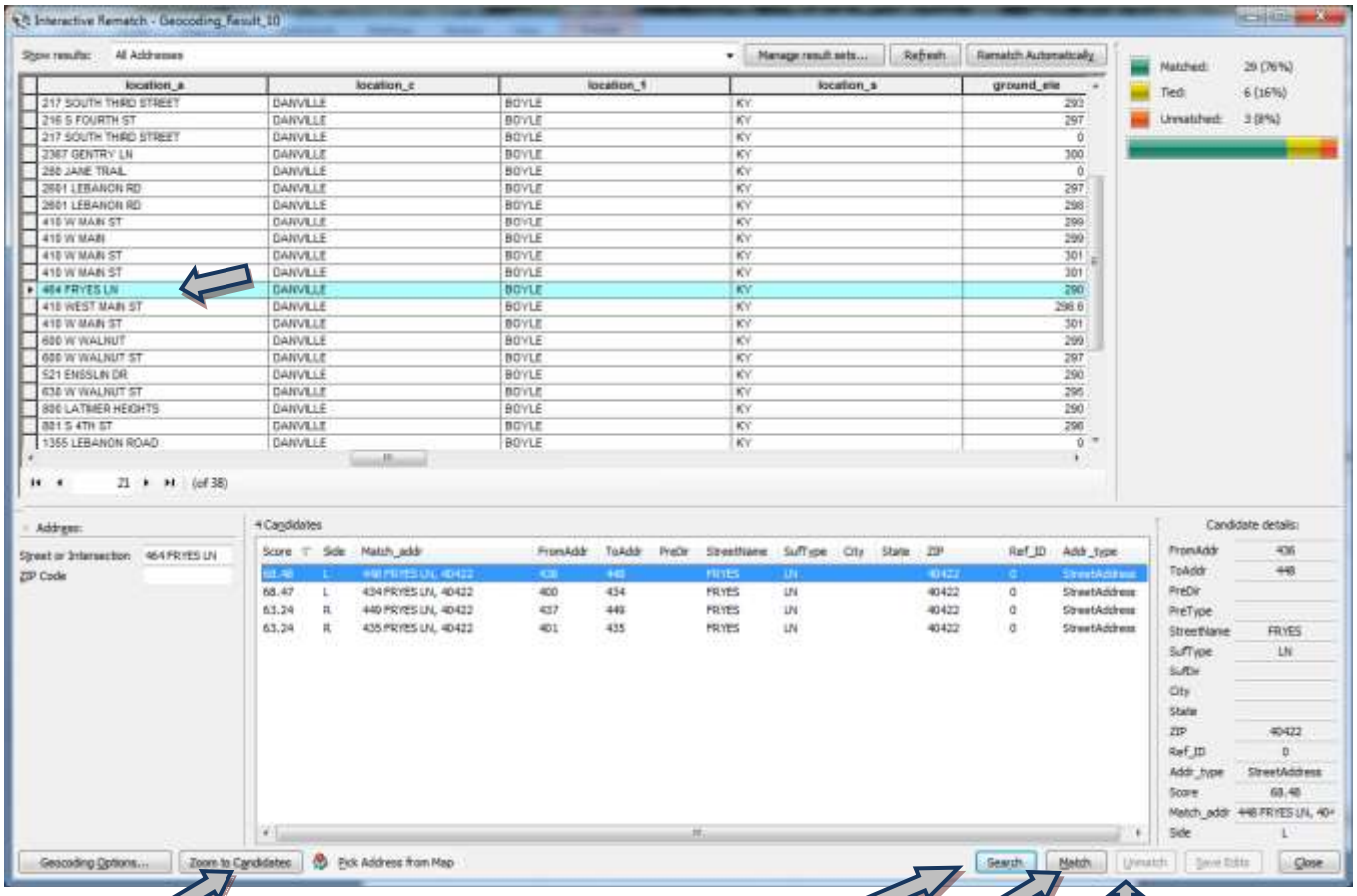
Click OK



Click Rematch to fix unmatched or tied scores or Close to finish creating the Danville_Antenna.SHP.

For this example, click Rematch to fix unmatched or tied scores.

Right click on the word Status near the top of the table (Blue Arrow), and choose sort descending. Select a record from the top box, then select an address to match from the candidate table and click match.



After matching all possible candidates, click close. The Geocoding results will be listed as the top layer in the Table of Contents. Any address that was a forced match, make note of the address and check the location. If needed, go into an edit session to move points over correct location. All information on spreadsheet will be included with new GIS point.

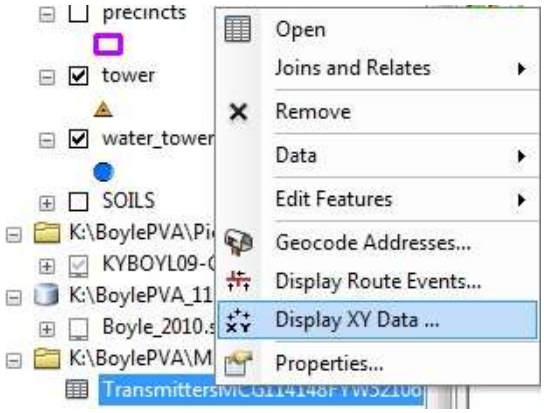
Note: Double click on the dot under Danville_Antenna and in the Symbol Selector box, type in the word ***Tower*** in the selection box. Scroll down and find ***Telecommunication Tower F*** or desired symbol.

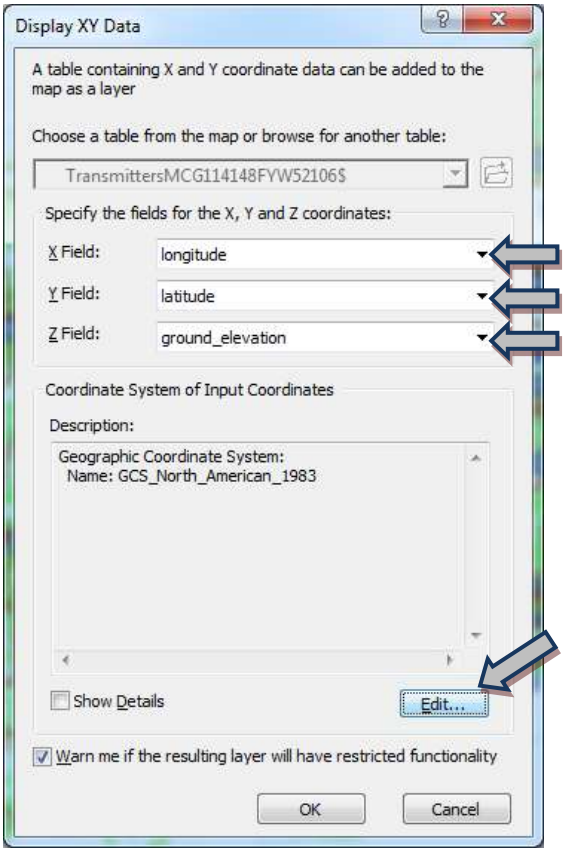
Creating points from X, Y, and/or Y positions from spreadsheets

To create a SHP file from a spreadsheet, add the spreadsheet into an ArcGIS project. Click the Add Data button and navigate to the spreadsheet file (.xls, .xlsx, .csv. and etc.).

Ex. K:\BoylePVA\MDB\Transmitters.xlsx Table….TransmittersMCG114148FYW52106$

After adding the Transmitters.xlsx spreadsheet into ArcGIS project, right mouse click on the file and select Display XY Data from the drop down menu.

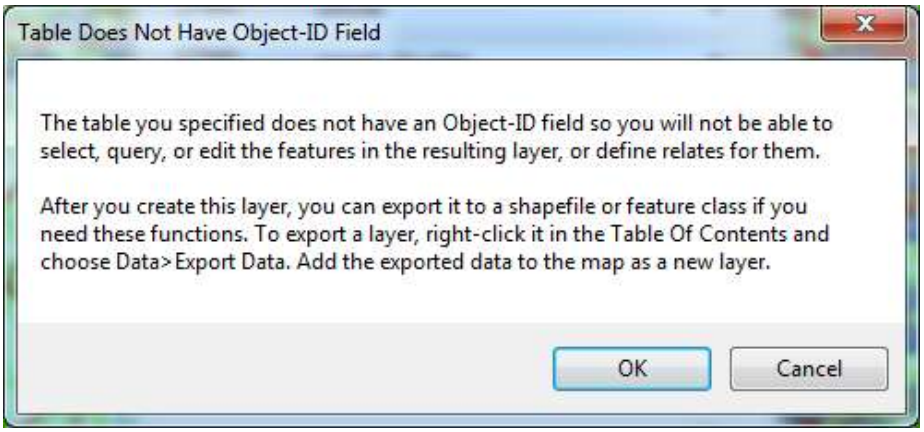




Longitude goes in the X Field
Latitude goes in the Y Field
Ground Elevation goes in the Z Field

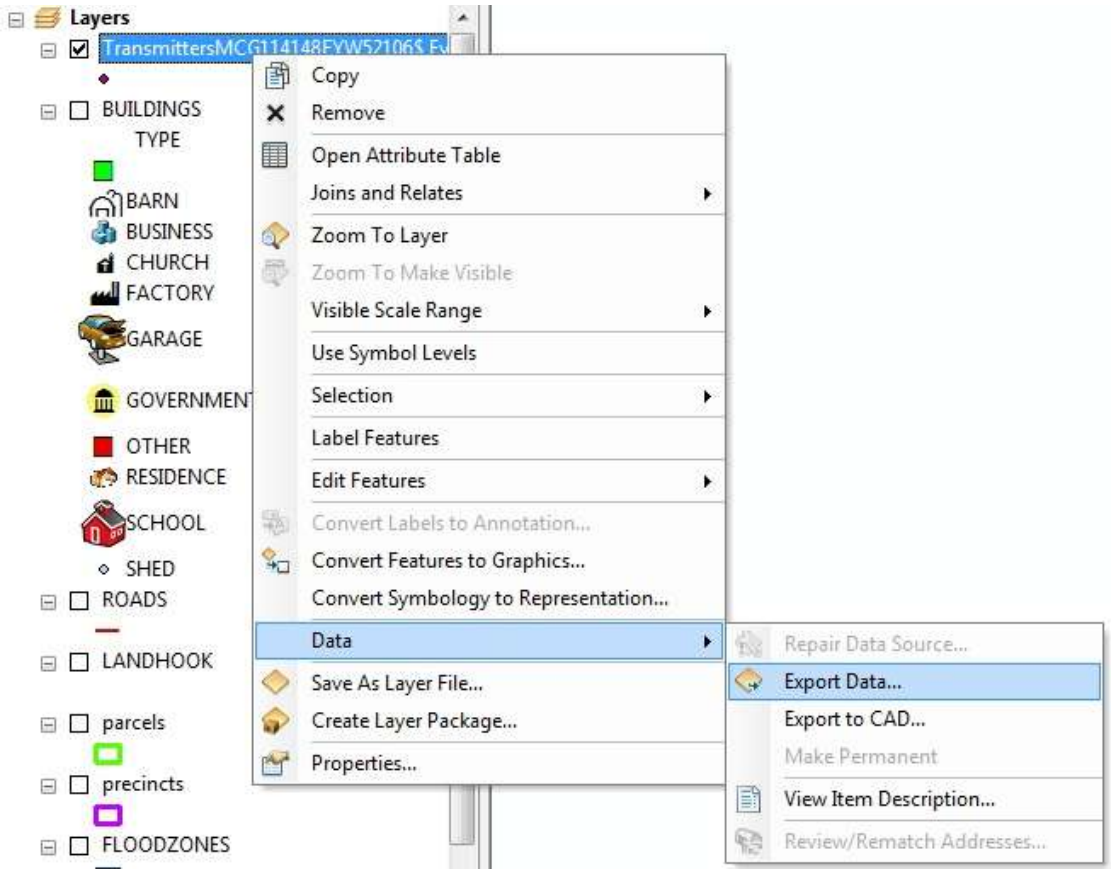
Click Edit and Select on the Spatial Reference Properties box. Double click on Geographic Coordinate Systems, next scroll down and double click on North America, then scroll down and double click NAD 1983.prj. Click OK and OK.

This Table does not have Object-ID field box will be displayed next.

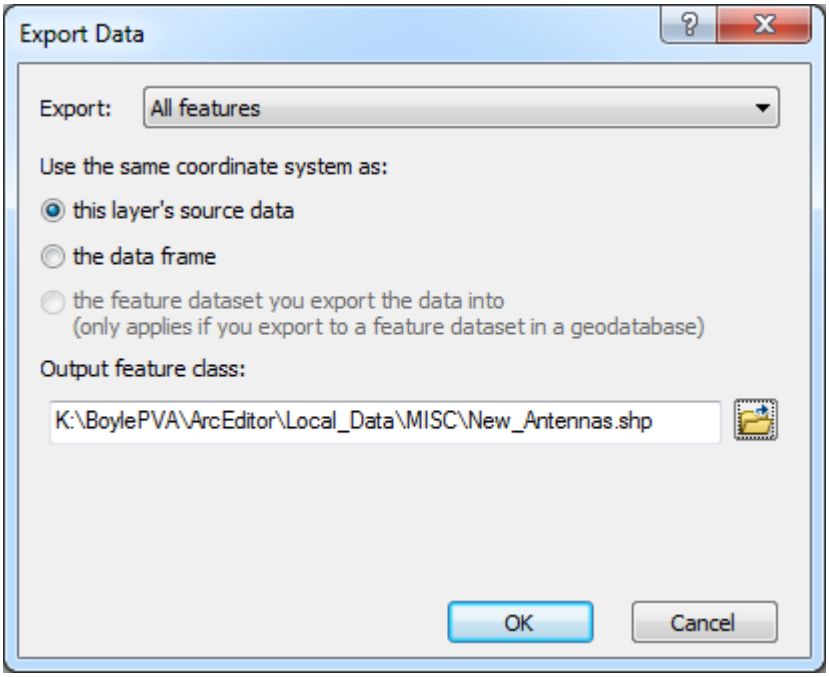


Click OK

The new layer will be shown in the Table of Contents. The new layer can be identified only. No editing, searches, or selections can be performed on this layer. It must be exported to a SHP file to perform the following function. To export it to a SHP, right click on the layer, from the drop down menu, select Data, from the next drop down menu, click Export Data. (See Below)



The Export Data box will appear next. It should default to All Features next to Export. Use the same coordinate system as ***this layer's source data.*** The Output feature class should be located in K:\BoylePVA\ArcEditor\Local_Data\MISC\ then click OK.

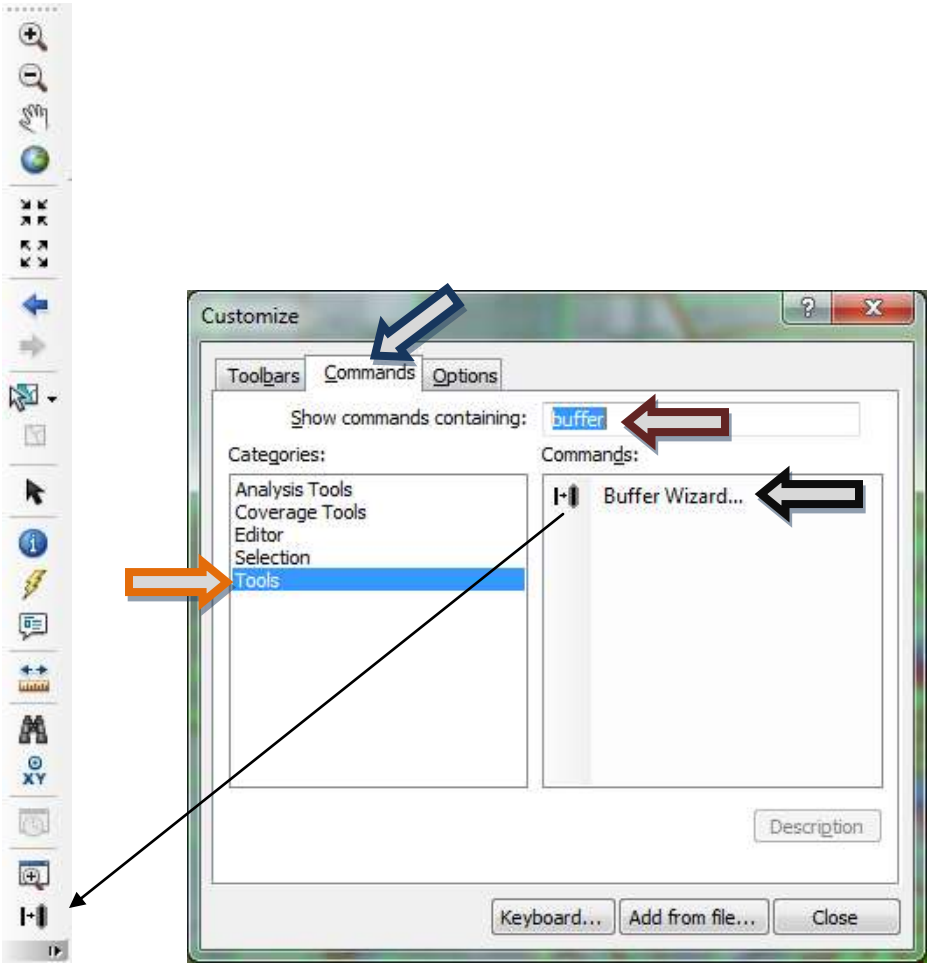


After ArcGIS is done processing this into a SHP file, it will ask, "Do you want to add the exported data to the map as a layer? Click Yes to add it to you project. After the layer is added, edits, selections, searches can be performed on the new layer.

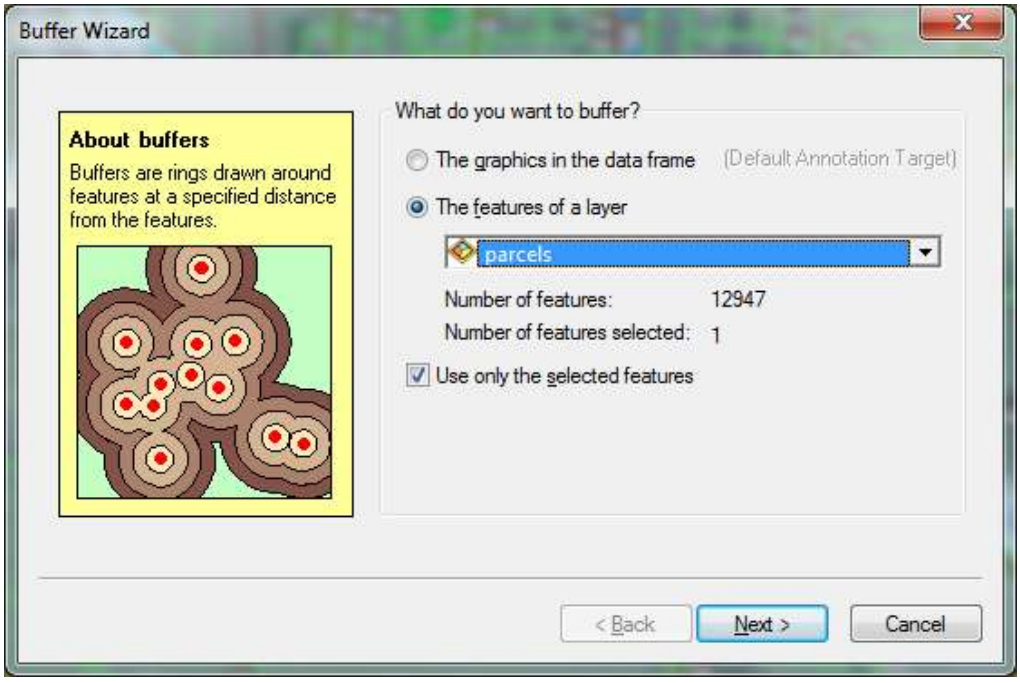
Buffering in ArcGIS

Buffering in ArcGIS can help in many ways. It can protect our kids from predators, save citizens money by showing the distance your house is from a fire hydrant, displays the amount of property affected by a highway widening project, and many other ways. With the addition of one Buffering Wizard, buffering is made easy.

To get started, double click in the GUI. This will open the Customize window. Click on the Commands tab next (Blue Arrow) and type in ***buffer*** in the Show commands containing area (Red Arrow). Click on Tools in the Categories box (Orange Arrow). Then click with the left mouse button and hold down on the Buffer Wizard (Black Arrow) in the Commands box and drag to the end of the Tools toolbar.

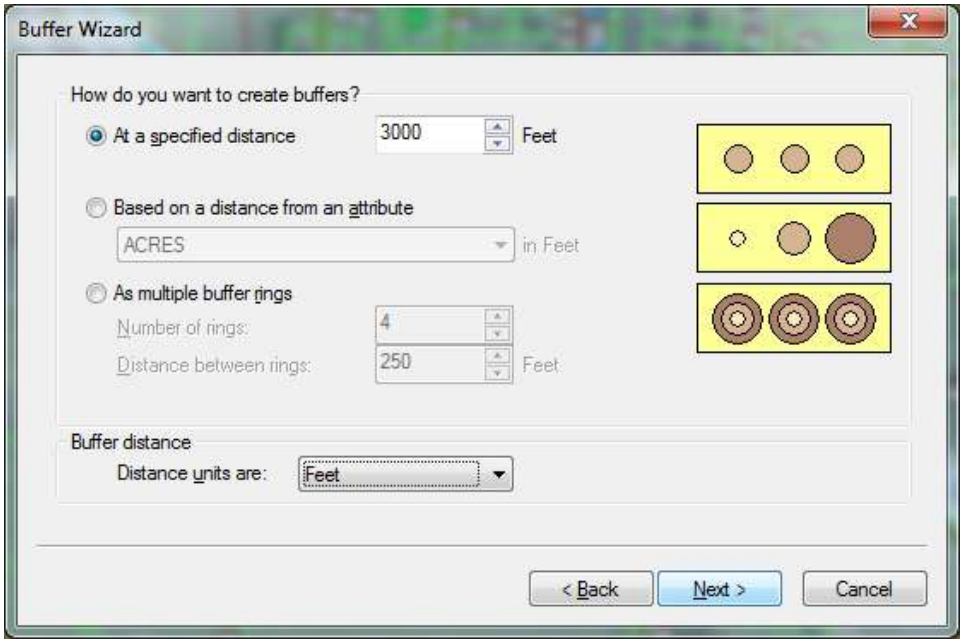


The first exercise using the buffer wizard will be for a drug dealer busted in a rock quarry located near an Elementary School in Perryville. The Sheriff needs to know if the location of the drug deal is within 3,000 feet of a school property. To get started, select the school property (010-000-033) with the select feature by rectangle tool.  Next, click the Buffer Wizard button. In the Buffer Wizard window, click ***The features of a layer*** and select ***Parcels*** from the drop down menu and make sure ***Use only the selected features*** is checked.



Click the Next button and go to the next menu box.

In the next Buffer Wizard window click on the ***At a specified distance*** field and type in 3,000. Change the distance units to feet under Buffer distance.



Click next to continue to the final buffer wizard window.

In the final window of the Buffer Wizard, click yes to ***dissolve barriers between.*** The next question, ***Create buffers so they are?***

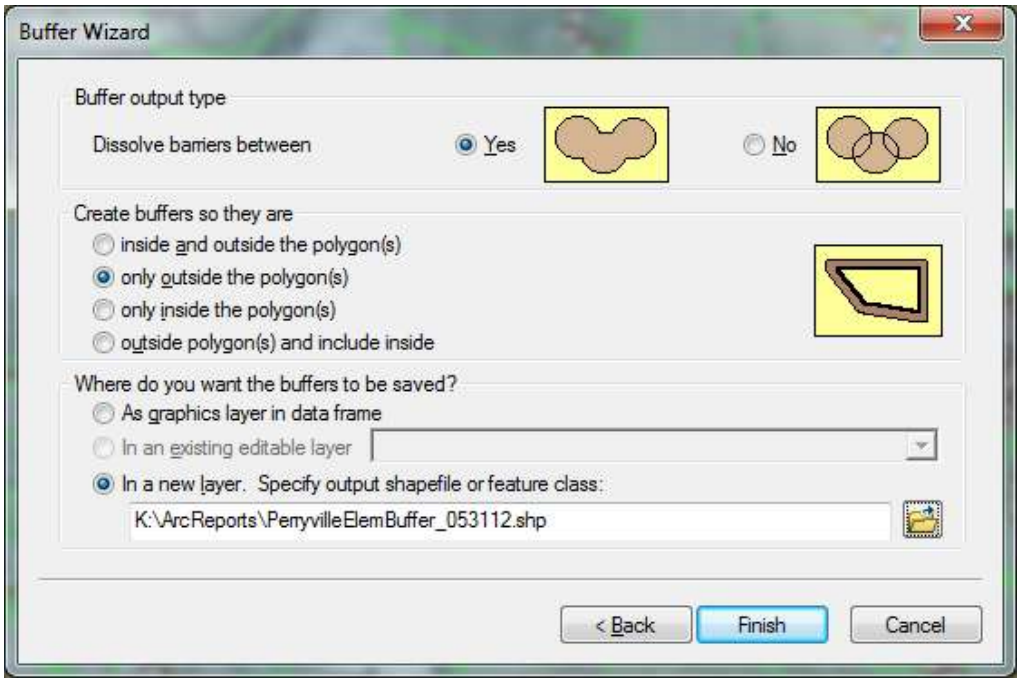
-inside and outside the polygon 

- only outside the polygon(s) (Select this) 

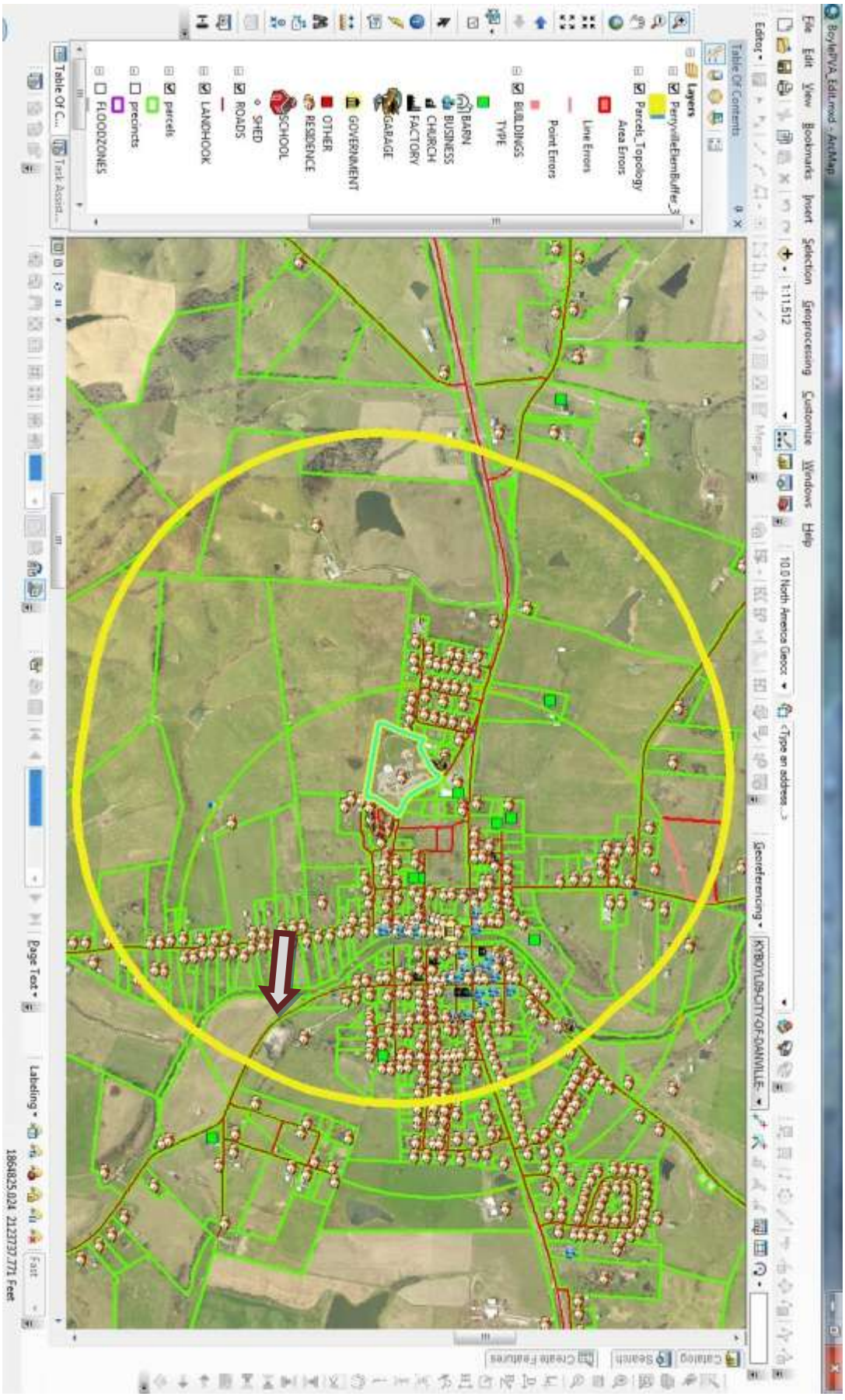
-only inside polygon(s) 

-outside polygon(s) and included inside 

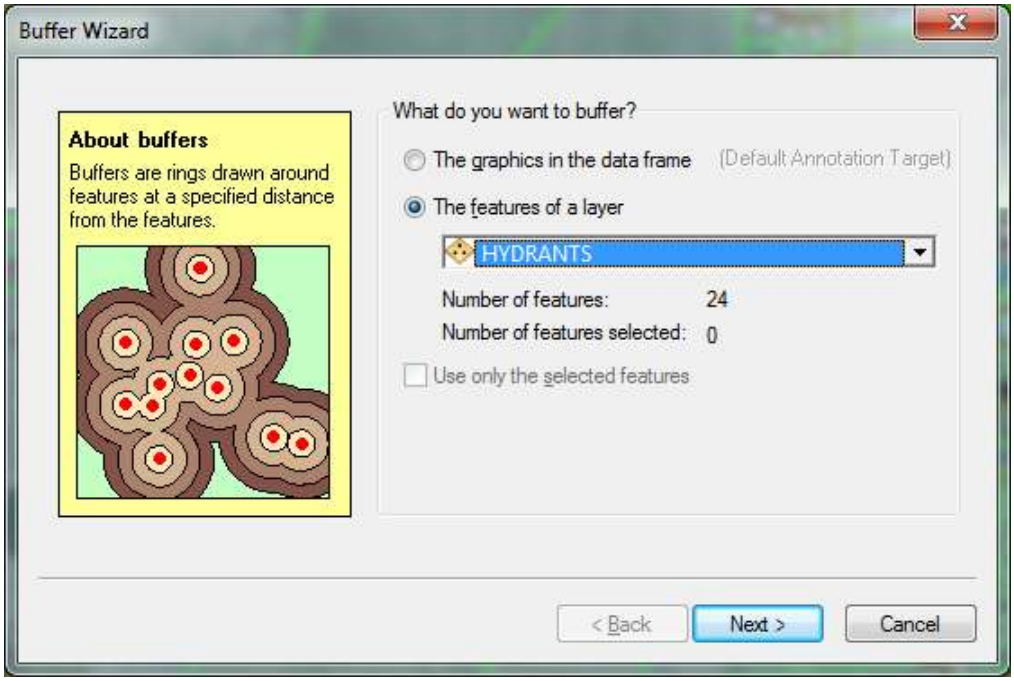
The last question is ***Where do you want the buffers to be saved?*** ArcGIS can save the new feature as a new layer or as a temporary layer that will delete when the ArcProject is closed. For this exercise, select ***In a new layer*** and click finish.



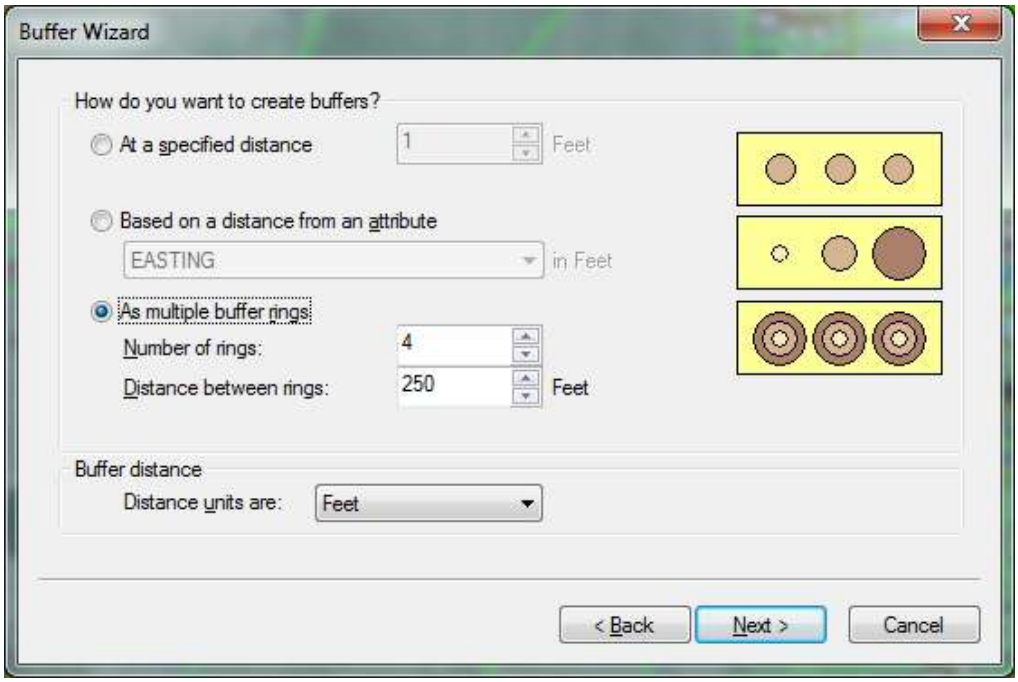
This will create a SHP file named ***PerryvilleElemBuffer_053112*** and it will display the buffered area. ArcGIS will need to be refreshed to see final results in the map viewing area. Now, check to see if the rock quarry is located inside the buffered area, if so the criminal's charges will be more severe!


Layers
PerryvilleElemBuffer_3
Parcels_Topology
Area Errors
Line Errors
Point Errors
BUILDINGS
TYPE
BARN
BUSINESS
CHURCH
FACTORY
GARAGE
GOVERNMENT
OTHER
RESIDENCE
SCHOOL
SHED
ROADS
LANDHOOK
parcels
precincts
FLOODZONES
1864825.024 2123737.771 Feet

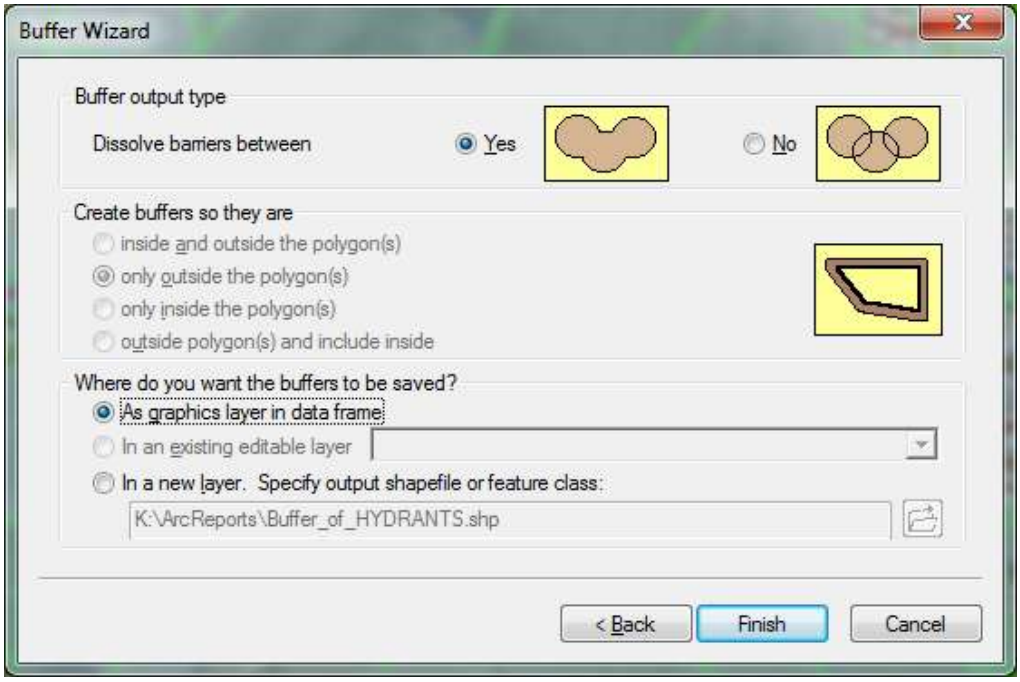
For the second exercise, we are using the Hydrant layer to see if Perryville can qualify to get a lower ISO rate to reduce residents fire insurance. To qualify, Perryville has to provide mapping evidence that all of its residents live within 500 ft or 1,000 feet of a fire hydrant. To get started, click the Buffer Wizard button on the Tools toolbar.



In the Buffer Wizard window, click ***The features of a layer*** and select Hydrants from the drop down menu. Click the Next button and go to the next menu and click on ***As multiple buffer rings*** type in ***4*** for the number of rings and the distance between the rings should be ***250 feet*** and then click next.



On the final window of the Buffer Wizard, click yes to ***dissolve barriers between.*** Next, the last question is ***Where do you want the buffers to be saved?*** ArcGIS can save the new feature as a layer or as a temporary layer that will delete when the ArcProject is closed. For this exercise, select ***As graphics layer in data frame*** and click finish.



This will create a temp layer named ***Buffer of Hydrants*** and it will display as rings. ArcGIS will need to be refreshed to see final results. If all the houses are covered by the rings, the city is covered and should qualify for lower rates, if not, the city should consider placing a fire hydrant in these areas. After the hydrant is placed, run the Buffer Wizard again to show that the entire city has equal fire protection.